SAMSUNG

GSM TELEPHONE
SGH-X490

SERVICE Manual

GSM TELEPHONE

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BASIC.

1. Specification

1-1. GSM General Specification

	GSM900 Phase 1	**EGSM900 Phase 2**	**DCS1800 Phase 1**	**PC1900 Phase 1**
Freq. Band[MHz] Uplink/Downlink	890~915 935~960	880~915 925~960	1710~1785 1805~1880	1850~1910 1930~1990
ARFCN range	1~124	0~124 & 915~1023	512~885	512~810
Tx/Rx spacing	45MHz	45MHz	95MHz	80MHz
Mod. Bit rate/ Bit Period	270.833kbps 3.692us	270.833kbps 3.692us	270.833kbps 3.692us	270.833kbps 3.692us
Time Slot Period/Frame Period	576.9us 4.615ms	576.9us 4.615ms	576.9us 4.615ms	576.9us 4.615ms
Modulation	0.3GMSK	0.3GMSK	0.3GMSK	0.3GMSK
MS Power	33dBm~5dBm	33dBm~5dBm	30dBm~0dBm	30dBm~0dBm
Power Class	5pcl ~ 19pcl	5pcl ~ 19pcl	0pcl ~ 15pcl	0pcl ~ 15pcl
Sensitivity	-102dBm	-102dBm	-100dBm	-100dBm
TDMA Mux	8	8	8	8
Cell Radius	35Km	35Km	2Km	2Km

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1-2. GSM TX power class

TX Power control level	GSM900
5	33±3 dBm
6	31±3 dBm
7	29±3 dBm
8	27±3 dBm
9	25±3 dBm
10	23±3 dBm
11	21±3 dBm
12	19±3 dBm
13	17±3 dBm
14	15±3 dBm
15	13±3 dBm
16	11±5 dBm
17	9±5dBm
18	7±5 dBm
19	5±5 dBm

TX Power control level	DCS1800
0	30±3 dBm
1	28±3 dBm
2	26±3 dBm
3	24±3 dBm
4	22±3 dBm
5	20±3 dBm
6	18±3 dBm
7	16±3 dBm
8	14±3 dBm
9	12±4 dBm
10	10±4 dBm
11	8±4dBm
12	6±4 dBm
13	4±4 dBm
14	2±5 dBm
15	0±5 dBm

TX Power control level	PCS1900
0	30±3 dBm
1	28±3 dBm
2	26±3 dBm
3	24±3 dBm
4	22±3 dBm
5	20±3 dBm
6	18±3 dBm
7	16±3 dBm
8	14±3 dBm
9	12±4 dBm
10	10±4 dBm
11	8±4dBm
12	6±4 dBm
13	4±4 dBm
14	2±5 dBm
15	0±5 dBm

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2. Circuit Description

2-1. SGH-X490 RF Circuit Description

2-1-1. RX PART

- ASM(U100) → Switching Tx, Rx path for GSM900, DCS1800, PCS1900 by logic controlling.

- ASM Control Logic (U100) → Truth Table

	VC1	VC2	VC3
Tx Mode (GSM900)	H	L	L
Tx Mode (DCS1800/1900)	L	H	L
Rx Mode (GSM900)	L	L	L
Rx Mode (DCS1800)	L	L	L
Rx Mode (PCS1900)	L	L	H

- FILTER

To convert Electromagnetic Field Wave to Acoustic Wave and then pass the specific frequency band.

- GSM FILTER (F101) → For filtering the frequency band between 925 and 960 MHz
- DCS FILTER (F102) → For filtering the frequency band between 1805 and 1880 MHz.
- PCS FILTER (F100) → For filtering the frequency band between 1930 and 1990 MHz.

- VC-TCXO (OSC101)

This module generates the 26MHz reference clock to drive the logic and RF. After division by two a reference clock of 13MHz is supplied to the other parts of the system through the pin CLKOUT. After additional process, the reference clock applies to the U100 Rx IQ demodulator and Tx IQ modulator. And then, the oscillator is controlled by serial data to select channel and use fast lock mode for GPRS high class operation.

- Transceiver (U101)

The receiver front-end which amplifies the GSM, DCS, PCS aerial signal, converts the chosen channel down to a low IF signal of 100 kHz. The first stages are symmetrical low noise amplifiers (LNAs). The LNAs are followed by an IQ down mixer. It consists of two mixers in parallel but driven by quadrature out of phase LO signals. The In phase (I) and Quadrature phase (Q) IF signals are low pass filtered to provide protection from high frequency offset interferes. The low IF I and Q signals are then fed into the channel filter. The front-end low IF I and Q outputs enter the integrated bandpass channel filter with provision for five 8 dB gain steps in front of the filter.

2-1-2. TX PART

I and Q baseband signals are applied to the IQ modulator that shifts the modulation spectrum up to the transmit IF. It is designed for low harmonic distortion, low carrier leakage and high image rejection to keep the phase error as small as possible.

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The modulator is loaded at its IF output by an integrated low pass filter that suppress unwanted spurs prior to get into the phase detector. The clock drive is generated by division of the RFLO signal provided for the transmit offset mixer. Baseband IQ signal fed into offset PLL, this function is included inside of U101 chip. OSC100 chip generates modulator signal which power level is about 6.5dBm and fed into Power Amplifier(U102). The PA output power and power ramping are well controlled by Auto Power Control circuit. We use offset PLL below table.

Modulation Spectrum	200kHz offset 30 kHz bandwidth	GSM	-36dBm
		DCS	-36dBm
	400kHz offset 30 kHz bandwidth	GSM	-36dBm
		DCS	-36dBm
	600kHz ~ 1.8MHz offset 30 kHz bandwidth	GSM	-51dBm
		DCS	-56dBm

2-2. Baseband Circuit description of SGH-X490

2-2-1. PCF50601

- Power Management

Ten low-dropout regulators designed specifically for GSM applications power the terminal and help ensure optimal system performance and long battery life. A programmable boost converter provides support for 1.8V, 3.0VSIMs, while a self-resetting, electronically fused switch supplies power to external accessories. Ancillary support functions, such as RTC module and High Voltage Charge pump, Clock generator, aid in reducing both board area and system complexity.
I2C BUS serial interface provides access to control and configuration registers. This interface gives a microprocessor full control of the PCF50601 and enables system designers to maximize both standby and talk times.
Supervisory functions. including a reset generator, an input voltage monitor, and a temperature sensor, support reliable system design. These functions work together to ensure proper system behavior during start-up or in the event of a fault condition(low microprocessor voltage, insufficient battery energy, or excessive die temperature).

- Backlight Brightness Modulator

The Backlight Brightness Modulator (BBM) contains a programmable Pulse-width modulator (PWM) and FET to modulate the intensity of a series of LED's or to control a DC/DC converter that drives LCD backlight.
This phone (SGH-X490) use PWM control to contrast the backlight brightness.

- Clock Generator

The Clock Generator (CG) generates all clocks for internal and external usage. The 32768 Hz crystal oscillator provides an accurate low clock frequency for the PCF50601 and other circuitry.

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2-2-2. LCD Connector

LCD is consisted of main LCD(color 65K UFB LCD) and sub LCD (B/W LCD).

Chip select signals LCD_MAIN_CS and LCD_SUB_CS, can enable Each LCD. BACKLIGHT signal enables white LED of main LCD. "LCD_RESET" signal initiates the reset process of the LCD.

16-bit data lines(HD(0)~HD(15)) transfers data and commands to LCD. Data and commands use "HA(1)" signal. If this signal is low, inputs to LCD are commands. If it is high, inputs to LCD are data.

The signal which informs the state of LCD is whether input or output, is required. But in this system, there is no input state from LCD. So only "HA(1)" signal is used to indicate write data or command to LCD. Power signals for LCD are "VBAT and "VDD3".

"SPK_P" and "SPK_N" are used for audio speaker containing voice or melody. And "VDD_VIB" from PCF50601 enables the motor.

2-2-3. Key

This is consisted of key interface pins among OM6359, KBIO(0:7). These signals compose the matrix. Result of matrix informs the key status to key interface in the OM6359. Power on/off key is separated from the matrix. So power on/off signal is connected with PCF50601 to enable PCF50601. Twelve key LEDs are use the "VDD_KEY" as supply voltage. "FLIP" informs the status of folder (open or closed) to the OM6359. This uses the hall effect IC, A321ELH-SAMSUNG. A magnet under main LCD enables A321ELH-SAMSUNG.

2-2-4. EMI ESD Filter

This system uses the EMI ESD filter, EMIF09 to protect noise from IF CONNECTOR part.

2-2-5. IF connetor

It is 18-pin connector. They are designed to use VBAT, V_EXT_CHARGE, TXD0, RXD0, RTS0, CTS0, JIG_REC, CHARGER_OK, RXD1, TXD1, AUX_MIC, AUX_SPK and GND. They connected to power supply IC, microprocessor and signal processor IC.

2-2-6. Battery Charge Management

A complete constant-current/constant-voltage linear charger is used for single cell lithium-ion batteries.

If TA connected to phone, "+DCVOLT" enable charger IC and supply current to battery.

When fault condition caused, "CHG_ON" signal level change low to high and charger IC stop charging process.

2-2-7. Audio

EARP_P and EARP_N from OM6359 are connected to the main speaker. MIC_P and MIC_N are connected to the main MIC. YMU788 is a synthesizer LSI for mobile phones. It is a LSI as an input/output device for sound sources, which is the mobile phones, such as MP3, AAC, etc, in addition to ringing-melodies.

As a synthesis, YMU788 is equipped 32 voices with different tones. Since the device is capable of simultaneously generating up to synchronous with the play of the FM synthesizer, various sampled voices can be used as sound effects. Since the play data of YMU788 are interpreted at anytime through FIFO, the length of the data(playing period) is not limited, so the device can flexibly support application such as incoming call melody music distribution service.

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The hardware sequencer built in this device allows playing of the complex music without giving excessive load to the CPU of the portable telephones.

For the purpose of enabling YMU788 to demonstrate its full capabilities, Yamaha purpose to use "SMAF:Synthetic music Mobile Application Format" as a data distribution format that is compatible with multimedia. Since the SMAF takes a structure that sets importance on the synchronization between sound and images, various contents can be written into it including incoming call melody with words that can be used for training karaoke, and commercial channel that combines texts, images and sounds, and others. The hardware sequencer of YMU788 directly interprets and plays blocks relevant to synthesis (playing music and reproducing ADPCM with FM synthesizer) that are included in data distributed in SMAF.

2-2-8. Memory

Signals in the OM6359 enable two memories. They use two volt supply voltage, VDD3 in the PCF50601 & VDD_1.9V with a LDO. This system uses Intel's memory, RD38F3050LOZTQ0. It is consisted of 128M bits flash NOR memory and 64M bits SRAM. It has 16 bit data line, HD[0~15] which is connected to OM6359. It has 26 bit address lines, HA[1~26]. NCSFLASH & NCSRAM signals are chip select. Writing process, HWR_N is low and it enables writing process to flash memory and SRAM. During reading process, HRD_N is low and it enables reading process to flash memory and SRAM. Reading or writing procedure is processed after HWR_N or HRD_N is enabled.

2-2-9. OM6359

OM6359 is consisted of ARM core and DSP core. It has 8x1Kword on-chip program/data RAM, 55 Kwords on-chip program ROM in the DSP. It has 4K*32bits ROM and 2K*32bits RAM in the ARM core. DSP is consisted of KBS, JTAG, EMI and UART. ARM core is consisted of EMI, PIC(Programmable Interrupt Controller), reset/power/clock unit, DMA controller, TIC(Test Interface Controller), peripheral bridge, PPI, SSI(Synchronous Serial Interface), ACC(Asynchronous communications controllers), timer, ADC, RTC(Real-Time Clock) and keyboard interface. KBIO(0:7), address lines of DSP core and HD[0~15]. HA[1~26], address lines of ARM core and HD[0~15], data lines of ARM core are connected to memory, YMU788.

NCSRAM, NCSFLASH in the ARM core are connected to each memory. HWR_N and HRD_N control the process of memory. External IRQ(Interrupt ReQuest) signals from each units, such as, PMU need the compatible process. KBIO[0~7] receive the status from key and RXD0/TXD0 are used for the communication using data link cable(DEBUG_DTR/RTS/TXD/RXD/CTS/DSR).

It has JTAG control pins(TDI/TDO/TCK) for ARM core and DSP core. It receives 13MHz clock in CKI pin from external TCXO. ADC(Analog to Digital Convertor) part receives the status of temperature, battery type and battery voltage.

2-2-10. TOH2600DGI4KRA(26MHz)

This system uses the 26MHz TCXO, TOH2600DGI4KRA, SEM. AFC control signal from OM6359 controls frequency from 26MHz x-tal. The clock output frequency of UAA3536 is 13MHz. This clock is connected to OM6359, YMU788.

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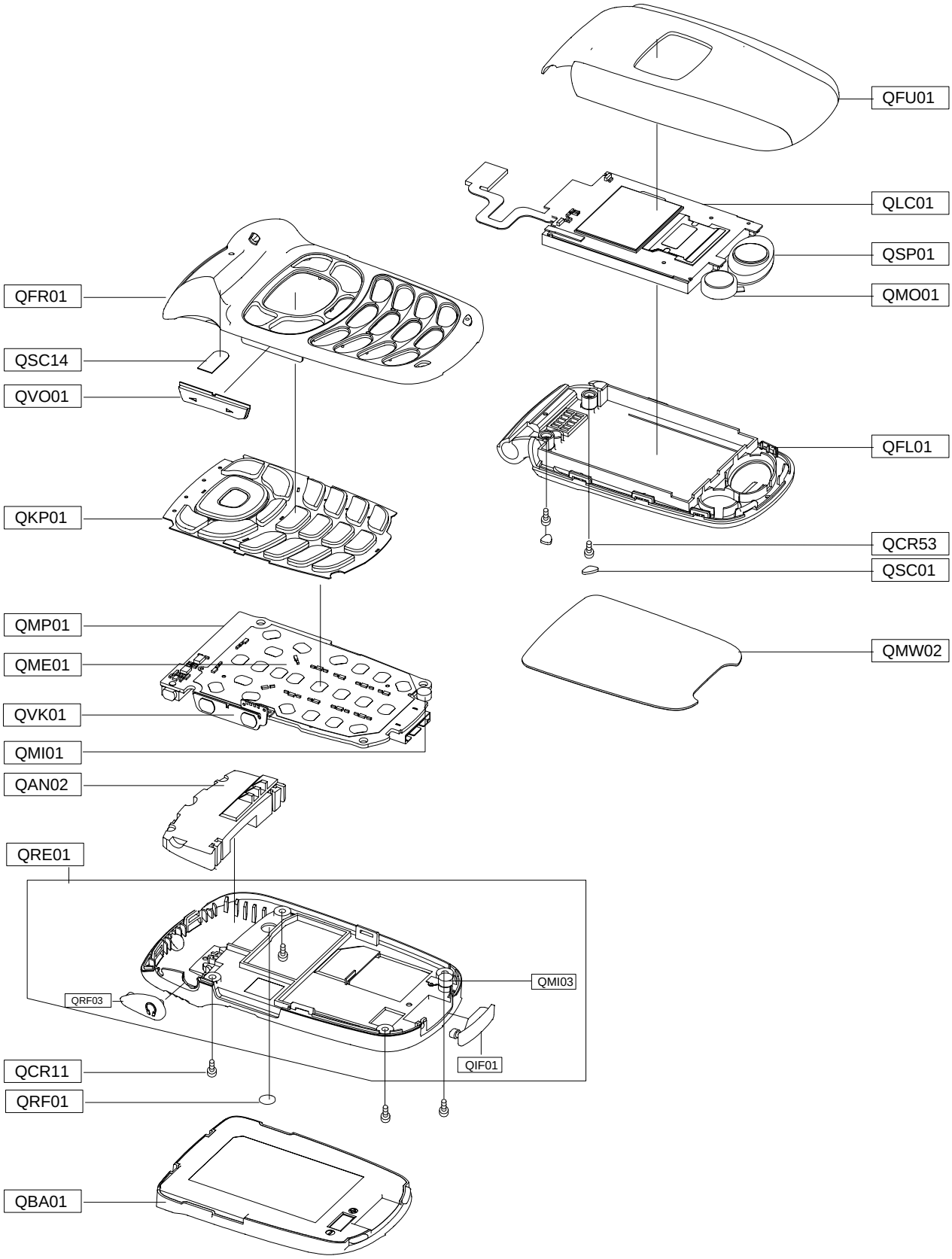
3. Exploded View and Parts List

3-1. Exploded View



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3-2. Parts List

Location NO.		Description	SEC CODE
QAN02		INTENNA-SGHX490	GH42-00699A
QBA01		BATTERY-1000MAH,WH/SIL,MAIN	GH43-02197A
QCR11		SCREW-MACHINE	6001-001654
QCR53		SCREW-MACHINE	6001-001639
QFL01		MEC-FOLDER LOWER	GH75-08664A
QFR01		MEC-FRONT COVER	GH75-06966A
QFU01		MEC-FOLDER UPPER	GH75-06471A
QKP01		MEC-KEYPAD(TMB/WST)	GH75-08152A
QLC01		MEA-LCD MODULE KIT(X495)	GH97-05095A
QME01		UNIT-METAL DOME	GH59-02046A
QMI01		MICROPHONE-ASSY-SGHX497	GH30-00198A
QMO01		MOTOR DC-SGHZ130	GH31-00154D
QMP01		PBA MAIN-SGHX490	GH92-02444A
QMW02		PCT-WINDOW MAIN	GH72-19918B
QRF01		MPR-RF SHEET	GH74-14435B
QSC01		MPR-SCREW SHEET	GH74-13610B
QSC14		MPR-TAPE FRONT FPC	GH74-08876A
QSP01		SPEAKER	3001-001779
QVK01		UNIT-VOLUME KEY	GH59-02053A
QVO01		MEC-VOLUME KEY	GH75-07274A
QRE01		MEC-REAR COVER	GH75-08454A
	QRF03	PMO-EAR COVER	GH72-23535A
	QIF01	PMO-IF COVER	GH72-23556A
	QMI03	RMO-RUBBER MIC REAR	GH73-04847A

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Description	SEC CODE
CARD-REGISTRATION	6801-001446
BAG PE	6902-000634
CBF INTERFACE-SGHS500 TEST CAB	GH39-00217A
CBF SIGNAL-SGHE800TEST	GH39-00283A
ADAPTOR-TAD	GH44-00482A
LABEL(P)-WATER SOAK	GH68-02026A
MANUAL-USER	GH68-08536A
LABEL(R)-MAIN(EU)	GH68-08622A
CUSHION-CASE(1-2)	GH69-03333A
BOX(P)-UNIT(T-MOBILE)	GH69-03459A
PMO-BATT LOCKER	GH72-19954A
PCT-WINDOW SUB	GH72-19964A
RMO-RUBBER TOP LCD A	GH73-04923A
RMO-RUBBER TOP LCD B	GH73-04924A
MPR-BOHO VINYL SUB(S-R)	GH74-03429B
MPR-BOHO VINYL REAR	GH74-12905A
MPR-TAPE WINDOW SUB	GH74-13223A
MPR-TAPE WINDOW MAIN	GH74-13608A
MPR-BOHO VINYL SUB	GH74-14432A
MPR-TAPE EL	GH74-14881A
MPR-BOHO VINYL LCD CONN	GH74-15350A
MPR-TAPE PBA EMI	GH74-15484A
MPR-SPONGE MOTOR	GH74-15610A
MPR-SPONGE PBA	GH74-15911A
MPR-TAPE PBA A	GH74-16066A
MPR-BOHO VINYL MAIN	GH74-16545B
MPR-BOHO VINYL MAIN(S)	GH74-16545C
MPR-BOHO VINYL SUB	GH74-17302A
INSTALL-SGHS500 TEST JIG	GH80-01909A

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3-3. Test Jig (GH80-01909A)

3-3-1. RF Test Cable (GH39-00283A)

3-3-2. Test Cable (GH39-00217A)

3-3-3. Serial Cable

3-3-4. Power Supply Cable

3-3-5. DATA CABLE (GH39-00219A)

3-3-6. TA (GH44-00184G)

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4. Electrical Parts List

Design LOC	Description	SEC CODE	STATUS
BAT300	BATTERY-LI(2ND)	4302-001180	SA
C101	C-CER,CHIP	2203-000278	SA
C102	C-CER,CHIP	2203-000812	SA
C103	C-CER,CHIP	2203-000854	SA
C104	C-CER,CHIP	2203-000854	SA
C105	C-CER,CHIP	2203-000278	SA
C106	C-CER,CHIP	2203-000278	SA
C107	C-CER,CHIP	2203-000854	SA
C108	C-CER,CHIP	2203-005057	SA
C109	C-CER,CHIP	2203-005482	SA
C110	C-CER,CHIP	2203-005057	SA
C111	C-CER,CHIP	2203-005482	SA
C112	C-CER,CHIP	2203-000233	SA
C113	C-CER,CHIP	2203-000233	SA
C114	C-CER,CHIP	2203-005482	SA
C115	C-CER,CHIP	2203-005057	SA
C116	C-CER,CHIP	2203-005138	SA
C117	C-CER,CHIP	2203-001383	SA
C118	C-CER,CHIP	2203-000359	SA
C119	C-CER,CHIP	2203-000696	SA
C120	C-CER,CHIP	2203-000836	SA
C121	C-CER,CHIP	2203-001101	SA
C122	C-CER,CHIP	2203-005482	SA
C123	C-CER,CHIP	2203-005057	SA
C124	C-CER,CHIP	2203-006053	SA
C125	C-CER,CHIP	2203-000438	SA
C126	C-CER,CHIP	2203-000233	SA
C127	C-TA,CHIP	2404-001239	SA
C128	C-CER,CHIP	2203-006141	SA
C129	C-CER,CHIP	2203-000438	SA
C130	C-CER,CHIP	2203-006190	SA
C132	C-CER,CHIP	2203-005503	SA
C133	C-CER,CHIP	2203-000311	SA
C134	C-CER,CHIP	2203-000233	SA
C135	C-CER,CHIP	2203-000254	SA
C136	C-CER,CHIP	2203-001153	SA
C137	C-CER,CHIP	2203-000550	SA
C138	C-CER,CHIP	2203-006137	SA
C139	C-CER,CHIP	2203-005482	SA
C140	C-CER,CHIP	2203-000679	SA
C141	C-CER,CHIP	2203-005482	SA
C142	C-CER,CHIP	2203-005057	SA
C143	C-CER,CHIP	2203-000233	SA
C144	C-CER,CHIP	2203-000254	SA
C145	C-CER,CHIP	2203-000438	SA
C146	C-CER,CHIP	2203-000438	SA
C147	C-CER,CHIP	2203-000438	SA
C152	C-CER,CHIP	2203-000278	SA
C153	C-CER,CHIP	2203-000278	SA
C156	C-CER,CHIP	2203-000438	SA

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Design LOC	Description	SEC CODE	STATUS
C157	C-CER,CHIP	2203-000359	SA
C158	C-CER,CHIP	2203-000359	SA
C200	C-CER,CHIP	2203-005061	SA
C203	C-CER,CHIP	2203-005061	SA
C204	C-CER,CHIP	2203-000254	SA
C206	C-CER,CHIP	2203-005061	SA
C207	C-CER,CHIP	2203-000254	SA
C208	C-CER,CHIP	2203-000254	SA
C210	C-CER,CHIP	2203-006423	SA
C212	C-CER,CHIP	2203-005061	SA
C213	C-CER,CHIP	2203-005482	SA
C214	C-CER,CHIP	2203-000854	SA
C215	C-CER,CHIP	2203-006423	SA
C216	C-CER,CHIP	2203-000854	SA
C218	C-CER,CHIP	2203-005061	SA
C219	C-CER,CHIP	2203-005482	SA
C220	C-CER,CHIP	2203-000254	SA
C221	C-CER,CHIP	2203-006423	SA
C222	C-CER,CHIP	2203-006423	SA
C223	C-CER,CHIP	2203-005482	SA
C224	C-CER,CHIP	2203-000438	SA
C225	C-CER,CHIP	2203-005482	SA
C300	C-CER,CHIP	2203-005482	SA
C301	C-CER,CHIP	2203-006105	SA
C302	C-CER,CHIP	2203-005482	SA
C304	C-TA,CHIP	2404-001394	SA
C305	C-CER,CHIP	2203-005482	SA
C306	C-CER,CHIP	2203-005482	SA
C307	C-TA,CHIP	2404-001374	SA
C308	C-CER,CHIP	2203-006257	SA
C309	C-CER,CHIP	2203-005482	SA
C310	C-CER,CHIP	2203-006208	SA
C311	C-TA,CHIP	2404-001225	SA
C312	C-CER,CHIP	2203-005395	SA
C313	C-CER,CHIP	2203-000386	SA
C314	C-CER,CHIP	2203-005482	SA
C315	C-CER,CHIP	2203-006257	SA
C316	C-CER,CHIP	2203-000386	SA
C317	C-CER,CHIP	2203-006562	SA
C318	C-CER,CHIP	2203-000386	SA
C319	C-CER,CHIP	2203-006562	SA
C320	C-CER,CHIP	2203-006053	SA
C321	C-CER,CHIP	2203-000885	SA
C322	C-CER,CHIP	2203-006208	SA
C323	C-CER,CHIP	2203-006324	SA
C324	C-CER,CHIP	2203-000812	SA
C325	C-CER,CHIP	2203-005065	SA
C326	C-TA,CHIP	2404-001225	SA
C327	C-TA,CHIP	2404-001225	SA
C328	C-CER,CHIP	2203-005482	SA

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Design LOC	Description	SEC CODE	STATUS
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C333	C-CER,CHIP	2203-006562	SA
C334	C-CER,CHIP	2203-006208	SA
C335	C-CER,CHIP	2203-006208	SA
C336	C-CER,CHIP	2203-000679	SA
C337	C-CER,CHIP	2203-006053	SA
C338	C-CER,CHIP	2203-006208	SA
C339	C-CER,CHIP	2203-006208	SA
C340	C-CER,CHIP	2203-006053	SA
C400	C-TA,CHIP	2404-001348	SA
C401	C-CER,CHIP	2203-000995	SA
C402	C-CER,CHIP	2203-005482	SA
C403	C-CER,CHIP	2203-005061	SA
C404	C-CER,CHIP	2203-006562	SA
C406	C-CER,CHIP	2203-000278	SA
C407	C-CER,CHIP	2203-000679	SA
C408	C-CER,CHIP	2203-005482	SA
C409	C-CER,CHIP	2203-005061	SA
C410	C-CER,CHIP	2203-005736	SA
C411	C-CER,CHIP	2203-000679	SA
C412	C-CER,CHIP	2203-005482	SA
C413	C-CER,CHIP	2203-000679	SA
C415	C-CER,CHIP	2203-000489	SA
C416	C-CER,CHIP	2203-000679	SA
C418	C-CER,CHIP	2203-000278	SA
C419	C-CER,CHIP	2203-006423	SA
C420	C-CER,CHIP	2203-005736	SA
C421	C-CER,CHIP	2203-000885	SA
C422	C-CER,CHIP	2203-000254	SA
C423	C-CER,CHIP	2203-001153	SA
C424	C-CER,CHIP	2203-005483	SA
C425	C-CER,CHIP	2203-005483	SA
C426	C-CER,CHIP	2203-006562	SA
C429	C-CER,CHIP	2203-000995	SA
C430	C-CER,CHIP	2203-000995	SA
C437	C-CER,CHIP	2203-006053	SA
C438	C-CER,CHIP	2203-005482	SA
C439	C-TA,CHIP	2404-001352	SA
C501	C-CER,CHIP	2203-002443	SA
C502	C-CER,CHIP	2203-005482	SA
C503	C-CER,CHIP	2203-005482	SA
C504	C-CER,CHIP	2203-000278	SA
C505	C-CER,CHIP	2203-000679	SA
C507	C-CER,CHIP	2203-000995	SA
C508	C-CER,CHIP	2203-000278	SA
C509	C-CER,CHIP	2203-000995	SA
C510	C-CER,CHIP	2203-000995	SA
C511	C-CER,CHIP	2203-000278	SA

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Design LOC	Description	SEC CODE	STATUS
C513	C-CER,CHIP	2203-006562	SA
C514	C-CER,CHIP	2203-006562	SA
C515	C-CER,CHIP	2203-006562	SA
CN300	CONNECTOR-CARD EDGE	3709-001355	SA
CN502	CONNECTOR-INTERFACE	3710-001611	SA
CN503	HEADER-BATTERY	3711-005783	SA
CON101	CONNECTOR-COAXIAL	3705-001358	SA
EAR400	JACK-EAR PHONE	3722-002067	SA
F100	FILTER-SAW	2904-001571	SA
F101	FILTER-SAW	2904-001550	SA
F102	FILTER-SAW	2904-001570	SA
HEA1	HEADER-BOARD TO BOARD	3711-005728	SA
L101	INDUCTOR-SMD	2703-002207	SA
L102	INDUCTOR-SMD	2703-002199	SA
L103	INDUCTOR-SMD	2703-002207	SA
L104	INDUCTOR-SMD	2703-002203	SA
L105	INDUCTOR-SMD	2703-002700	SA
L106	INDUCTOR-SMD	2703-001726	SA
L107	INDUCTOR-SMD	2703-002308	SA
L108	INDUCTOR-SMD	2703-002700	SA
L109	INDUCTOR-SMD	2703-002308	SA
L110	INDUCTOR-SMD	2703-002308	SA
L111	INDUCTOR-SMD	2703-002199	SA
L112	INDUCTOR-SMD	2703-002176	SA
L113	INDUCTOR-SMD	2703-001727	SA
L114	INDUCTOR-SMD	2703-002176	SA
L115	INDUCTOR-SMD	2703-002203	SA
L116	INDUCTOR-SMD	2703-002368	SA
L117	INDUCTOR-SMD	2703-001708	SA
L300	BEAD-SMD	3301-001105	SA
L400	BEAD-SMD	3301-001362	SA
L401	BEAD-SMD	3301-001362	SA
L402	BEAD-SMD	3301-001105	SA
L403	BEAD-SMD	3301-001105	SA
L501	BEAD-SMD	3301-001438	SA
LED501	LED	0601-002037	SA
LED502	LED	0601-002037	SA
LED503	LED	0601-002037	SA
LED504	LED	0601-002037	SA
LED505	LED	0601-002037	SA
LED506	LED	0601-002037	SA
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LED509	LED	0601-002037	SA
LED510	LED	0601-002037	SA
LED511	LED	0601-002037	SA
LED512	LED	0601-002037	SA
OSC100	OSCILLATOR-VCO	2806-001326	SA
OSC101	OSCILLATOR-VCTCXO	2809-001281	SA
Q100	TR-DIGITAL	0504-001151	SA

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R102	R-CHIP	2007-000162	SA
R103	R-CHIP	2007-000162	SA
R104	R-CHIP	2007-007148	SA
R105	R-CHIP	2007-000141	SA
R106	R-CHIP	2007-007528	SA
R107	R-CHIP	2007-001288	SA
R108	R-CHIP	2007-000171	SA
R109	R-CHIP	2007-001329	SA
R110	R-CHIP	2007-000144	SA
R111	R-CHIP	2007-001308	SA
R112	R-CHIP	2007-001308	SA
R113	R-CHIP	2007-000566	SA
R114	R-CHIP	2007-000148	SA
R115	R-CHIP	2007-001288	SA
R116	R-CHIP	2007-007311	SA
R117	R-CHIP	2007-000566	SA
R118	R-CHIP	2007-007699	SA
R119	R-CHIP	2007-007699	SA
R120	R-CHIP	2007-001308	SA
R121	R-CHIP	2007-001308	SA
R122	R-CHIP	2007-000171	SA
R123	R-CHIP	2007-000171	SA
R125	R-CHIP	2007-008672	SA
R126	R-CHIP	2007-001308	SA
R127	R-CHIP	2007-000142	SA
R128	R-CHIP	2007-000148	SA
R129	R-CHIP	2007-000138	SA
R130	R-CHIP	2007-008213	SA
R131	R-CHIP	2007-008213	SA
R132	R-CHIP	2007-008213	SA
R133	R-CHIP	2007-008213	SA
R134	R-CHIP	2007-000140	SA
R135	R-CHIP	2007-000140	SA
R136	R-CHIP	2007-000171	SA
R200	R-CHIP	2007-000174	SA
R201	R-CHIP	2007-008055	SA
R204	R-CHIP	2007-000162	SA
R205	R-CHIP	2007-008055	SA
R206	R-CHIP	2007-008055	SA
R207	R-CHIP	2007-008055	SA
R208	R-CHIP	2007-008052	SA
R209	R-CHIP	2007-008516	SA
R210	R-CHIP	2007-008055	SA
R211	R-CHIP	2007-007107	SA
R212	R-CHIP	2007-007142	SA
R213	R-CHIP	2007-007001	SA
R214	R-CHIP	2007-007142	SA
R215	R-CHIP	2007-001284	SA
R216	R-CHIP	2007-000148	SA

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Design LOC	Description	SEC CODE	STATUS
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R219	R-CHIP	2007-000162	SA
R220	R-CHIP	2007-007107	SA
R221	R-CHIP	2007-007001	SA
R222	R-CHIP	2007-000171	SA
R223	R-CHIP	2007-008588	SA
R224	R-CHIP	2007-008588	SA
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R301	R-CHIP	2007-000148	SA
R302	R-CHIP	2007-007573	SA
R303	R-CHIP	2007-007334	SA
R304	R-CHIP	2007-008117	SA
R305	R-CHIP	2007-000151	SA
R306	R-CHIP	2007-007100	SA
R400	R-CHIP	2007-002796	SA
R401	R-CHIP	2007-000140	SA
R402	R-CHIP	2007-000148	SA
R403	R-CHIP	2007-008054	SA
R404	R-CHIP	2007-000140	SA
R405	R-CHIP	2007-008542	SA
R406	R-CHIP	2007-008055	SA
R407	R-CHIP	2007-002796	SA
R408	R-CHIP	2007-008055	SA
R409	R-CHIP	2007-007334	SA
R410	R-CHIP	2007-001313	SA
R411	R-CHIP	2007-008542	SA
R412	R-CHIP	2007-007483	SA
R413	R-CHIP	2007-007589	SA
R414	R-CHIP	2007-007138	SA
R415	R-CHIP	2007-007981	SA
R416	R-CHIP	2007-007488	SA
R417	R-CHIP	2007-007489	SA
R418	R-CHIP	2007-000138	SA
R422	R-CHIP	2007-000138	SA
R424	R-CHIP	2007-008542	SA
R500	R-CHIP	2007-000162	SA
R501	R-CHIP	2007-008055	SA
R502	R-CHIP	2007-008531	SA
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R508	R-CHIP	2007-008531	SA
R510	R-CHIP	2007-001298	SA
R511	R-CHIP	2007-001298	SA

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Design LOC	Description	SEC CODE	STATUS
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R513	R-CHIP	2007-001298	SA
R514	R-CHIP	2007-001298	SA
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R520	R-CHIP	2007-001298	SA
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R541	R-CHIP	2007-009084	SA
R542	R-CHIP	2007-009084	SA
R543	R-CHIP	2007-009084	SA
R544	R-CHIP	2007-009084	SA
R545	R-CHIP	2007-009084	SA
R546	R-CHIP	2007-009084	SA
R547	R-CHIP	2007-000162	SA
SW500	IC-HALL EFFECT S/W	1009-001010	SA
TH200	THERMISTOR-NTC	1404-001221	SA
TH501	VARISTOR	1405-001093	SA
TH502	VARISTOR	1405-001093	SA
TH503	VARISTOR	1405-001093	SA
U100	DUPLEXER-ASM	2909-001246	SA
U101	IC-TRANSCEIVER	1205-002327	SA
U102	IC-POWER AMP	1201-002075	SA
U201	IC-MCP	1108-000019	SA
U202	IC-COMM. CONTROLLER	1205-002607	SA
U300	IC-BATTERY	1203-003109	SA
U301	DIODE-TVS	0406-001200	SA
U302	IC-CONTROLLER	1205-002350	SA
U303	IC-POSI.FIXED REG.	1203-003808	SA
U401	IC-VOLTAGE COMP.	1202-001036	SA
U402	IC-ANALOG MULTIPLEX	1001-001306	SA
U404	TR-DIGITAL	0504-001100	SA
U406	IC-MELODY	1204-002461	SA
U408	IC-CMOS LOGIC	0801-002237	SA
U501	FILTER-EMI/ESD	2901-001325	SA

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Design LOC	Description	SEC CODE	STATUS
U502	IC-CMOS LOGIC	0801-002882	SA
U503	FILTER-EMI/ESD	2901-001246	SA
U504	FILTER-EMI/ESD	2901-001325	SA
U506	FILTER-EMI/ESD	2901-001325	SA
U507	FILTER-EMI/ESD	2901-001325	SA
U508	IC-CMOS LOGIC	0801-002882	SA
U510	IC-BUS SWITCH	1205-002779	SA
U511	IC-BUS SWITCH	1205-002779	SA
U512	IC-BUS SWITCH	1205-002779	SA
V401	DIODE-TVS	0406-001201	SA
V402	DIODE-TVS	0406-001201	SA
V501	VARISTOR	1405-001121	SA
V502	VARISTOR	1405-001121	SA
V504	VARISTOR	1405-001121	SA
V505	VARISTOR	1405-001121	SA
V506	VARISTOR	1405-001121	SA
V507	VARISTOR	1405-001121	SA
V509	VARISTOR	1405-001121	SA
X300	CRYSTAL-SMD	2801-004339	SA
ZD300	DIODE-ZENER	0403-001427	SA
ZD401	DIODE-TVS	0406-001201	SA
ZD402	DIODE-TVS	0406-001197	SA
ZD406	DIODE-TVS	0406-001201	SA
ZD501	DIODE-ZENER	0403-001387	SA
ZD502	DIODE-TVS	0406-001167	SA
ZD503	DIODE-TVS	0406-001197	SA
ZD504	DIODE-TVS	0406-001197	SA

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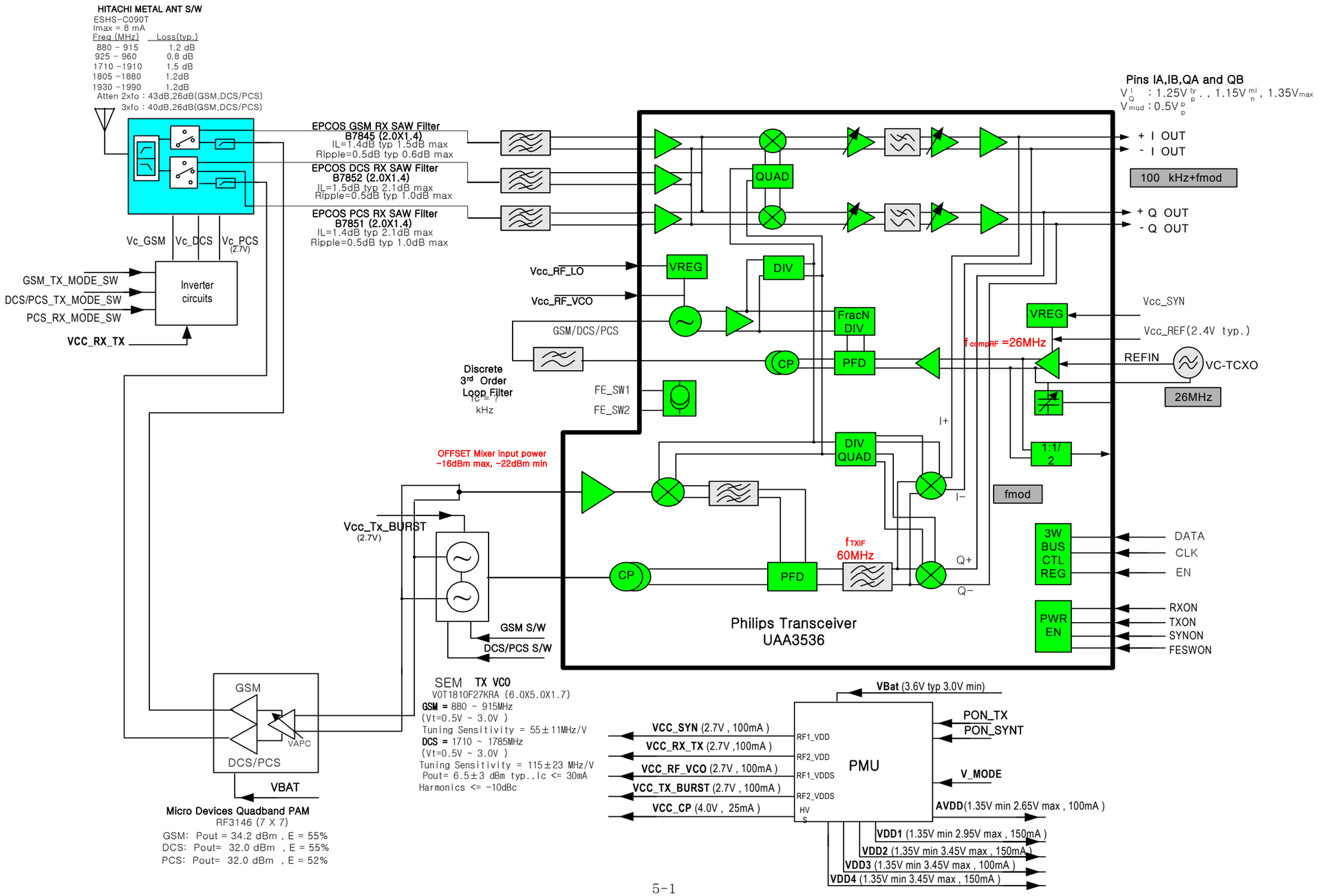
5. Block Diagrams

5-1. RF Solution Block Diagram



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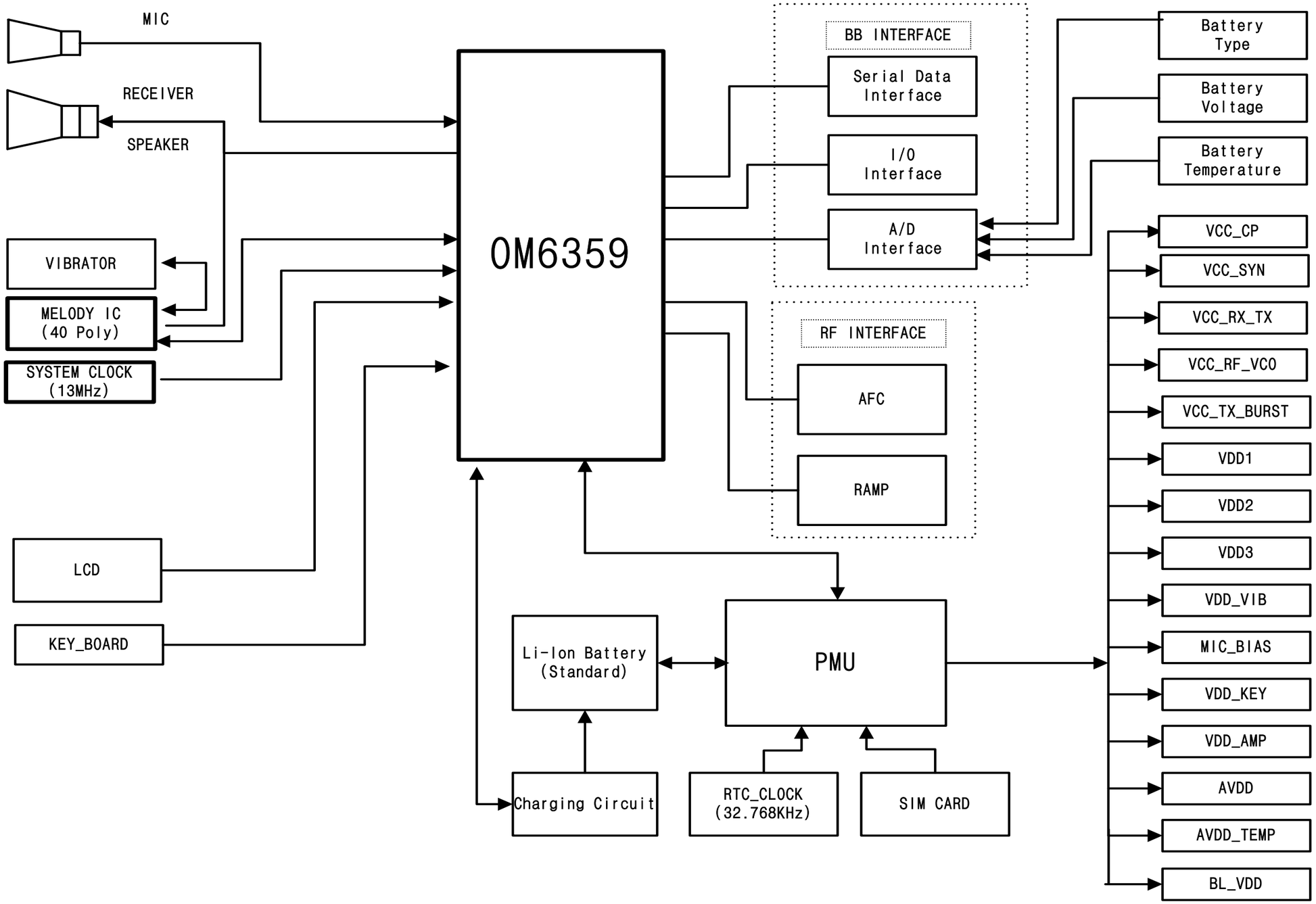
5-2. Base Band Solution Block Diagram



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6. PCB Diagrams

6-1. PCB Top Diagram

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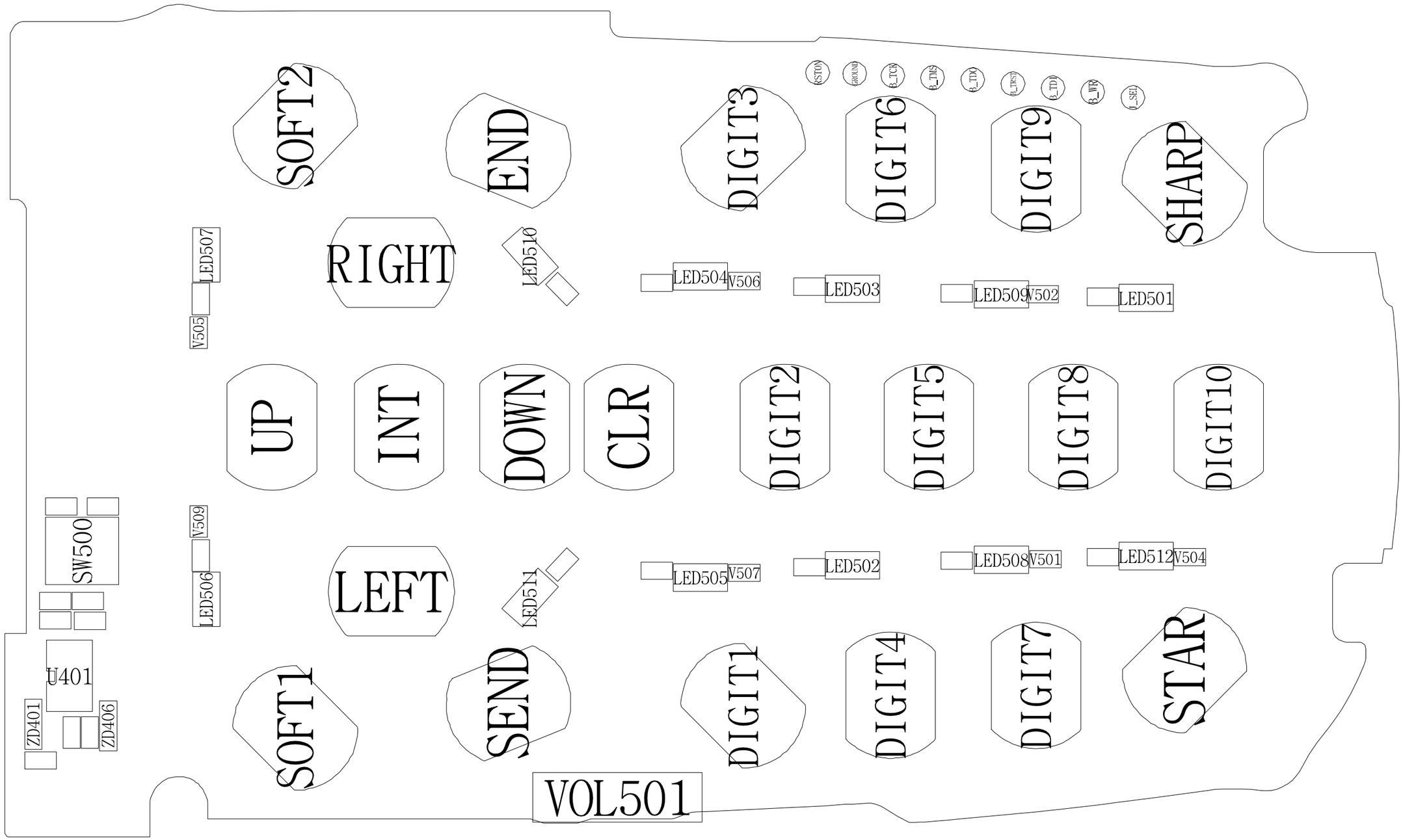
6-2. PCB Bottom Diagram



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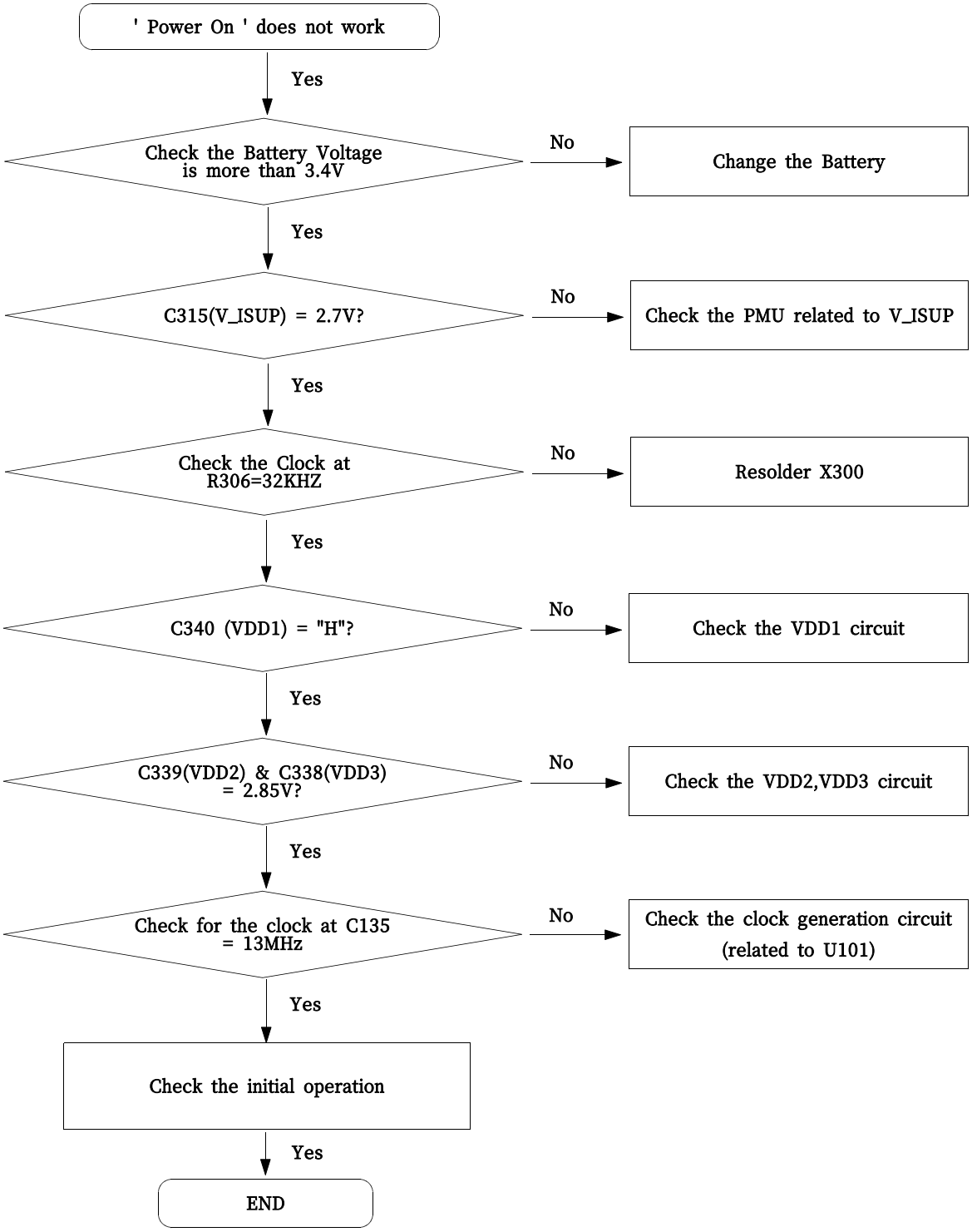
7. Flow Chart of Troubleshooting

7-1. Power On



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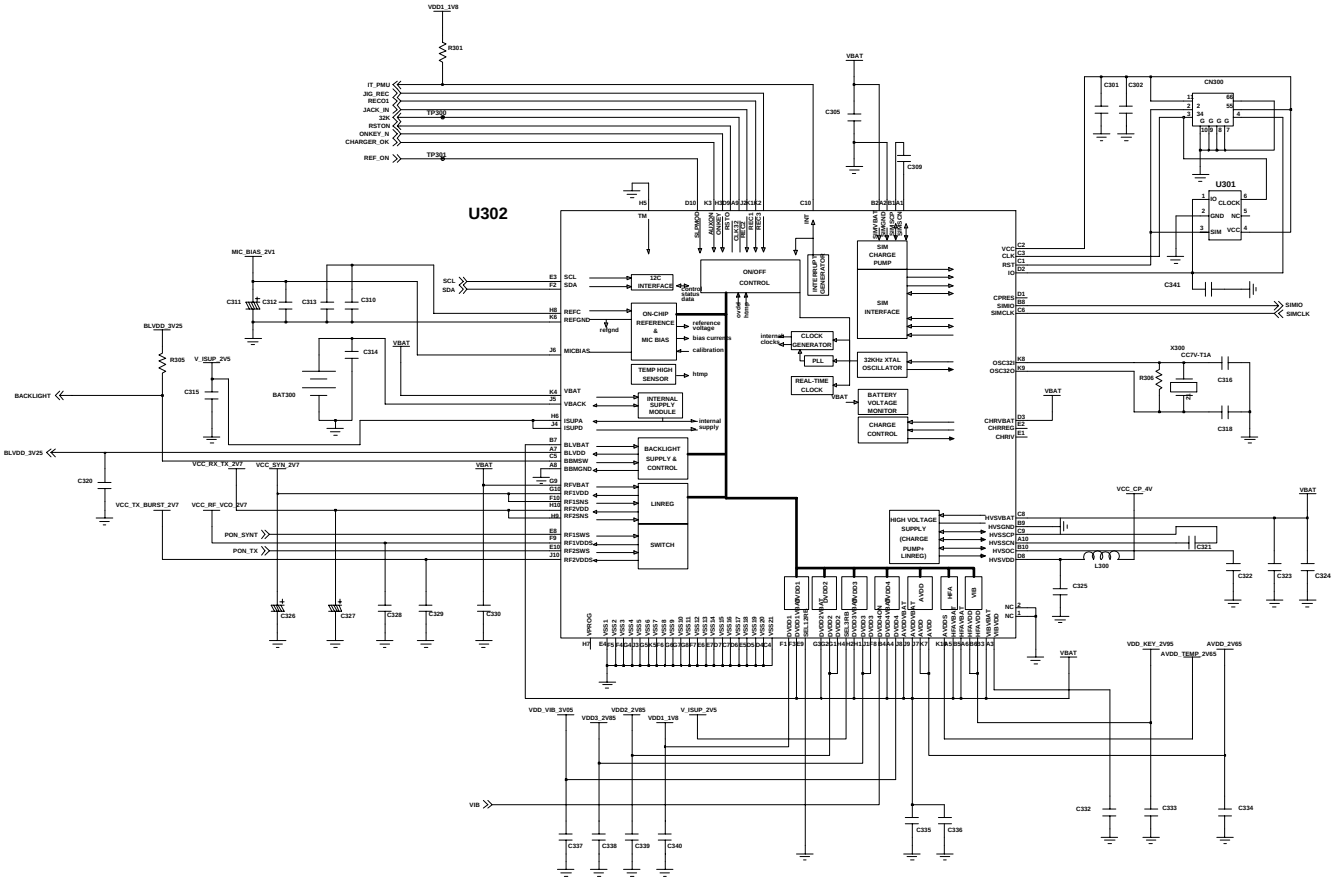
Power On



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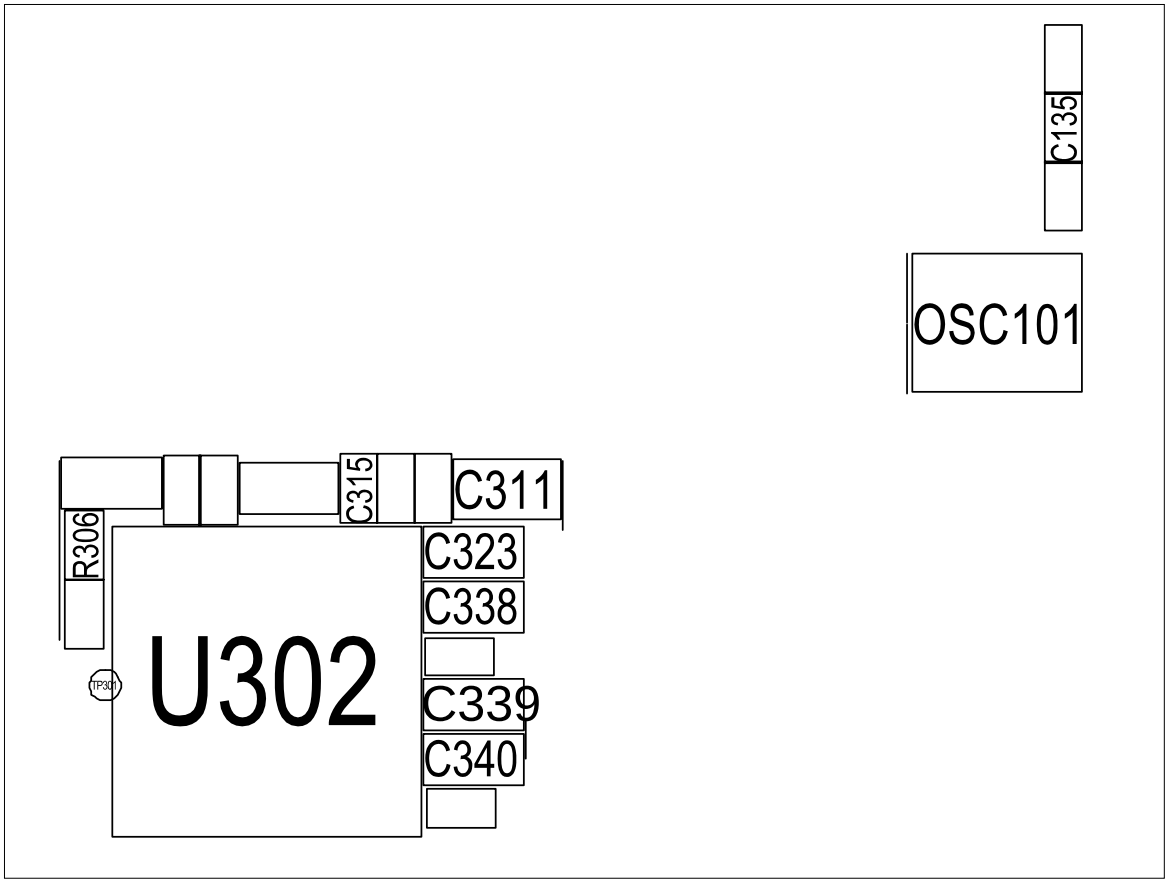

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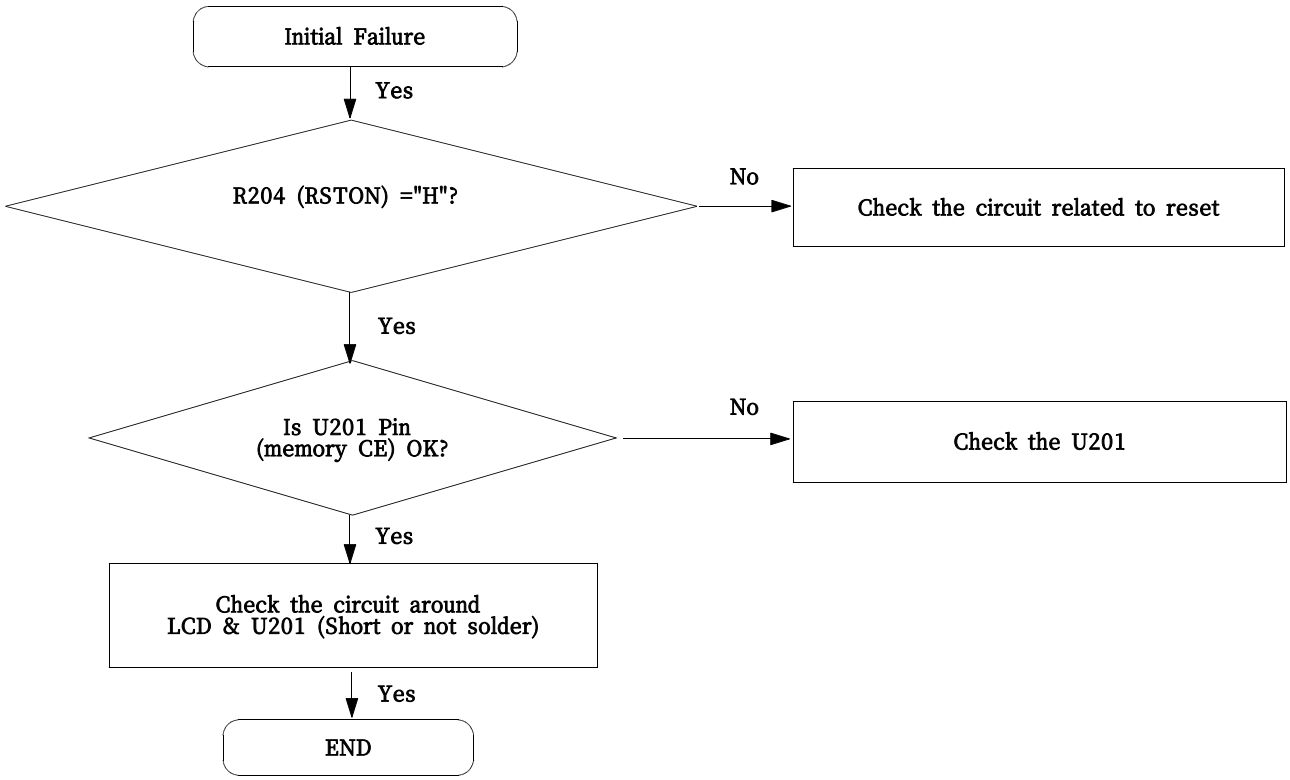
7-2. Initial



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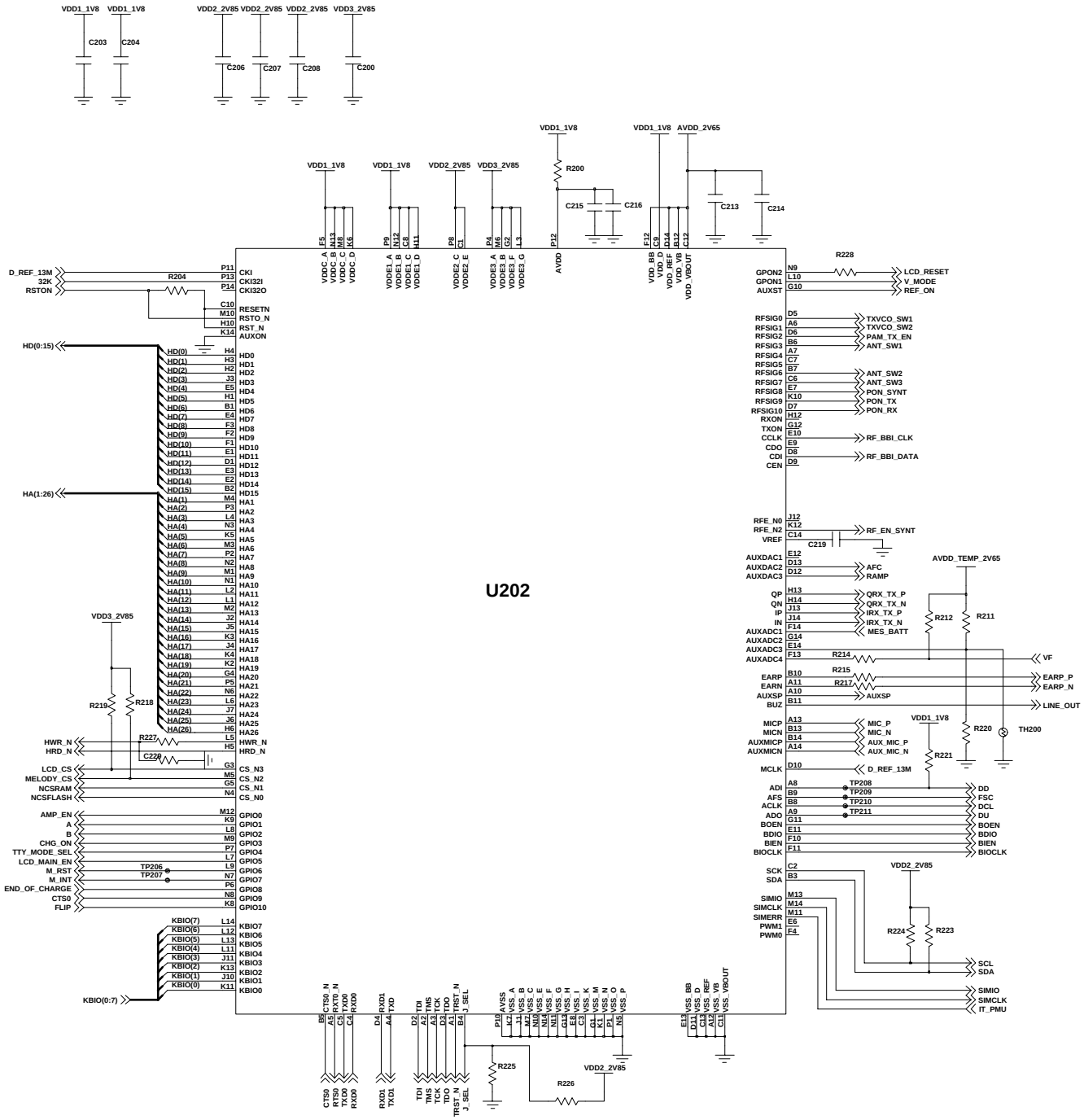
Initial



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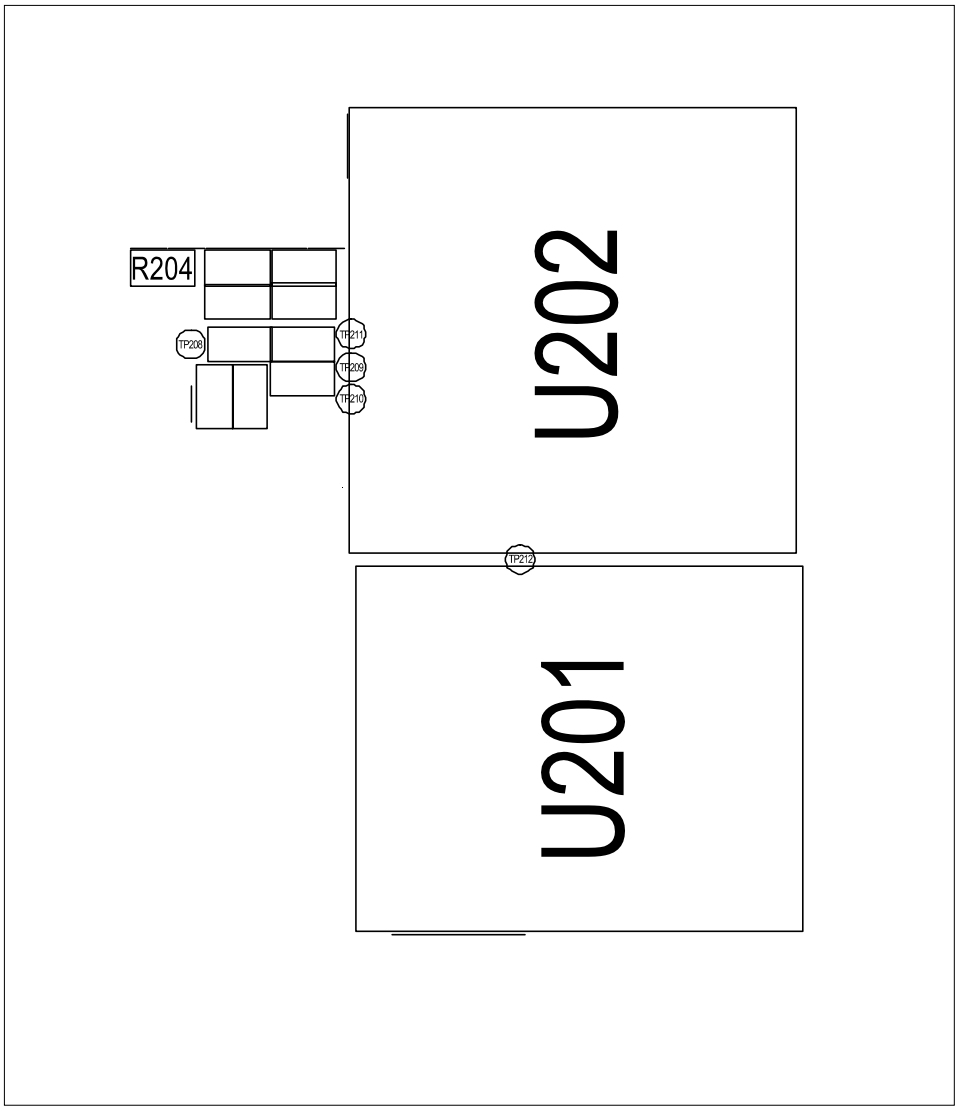

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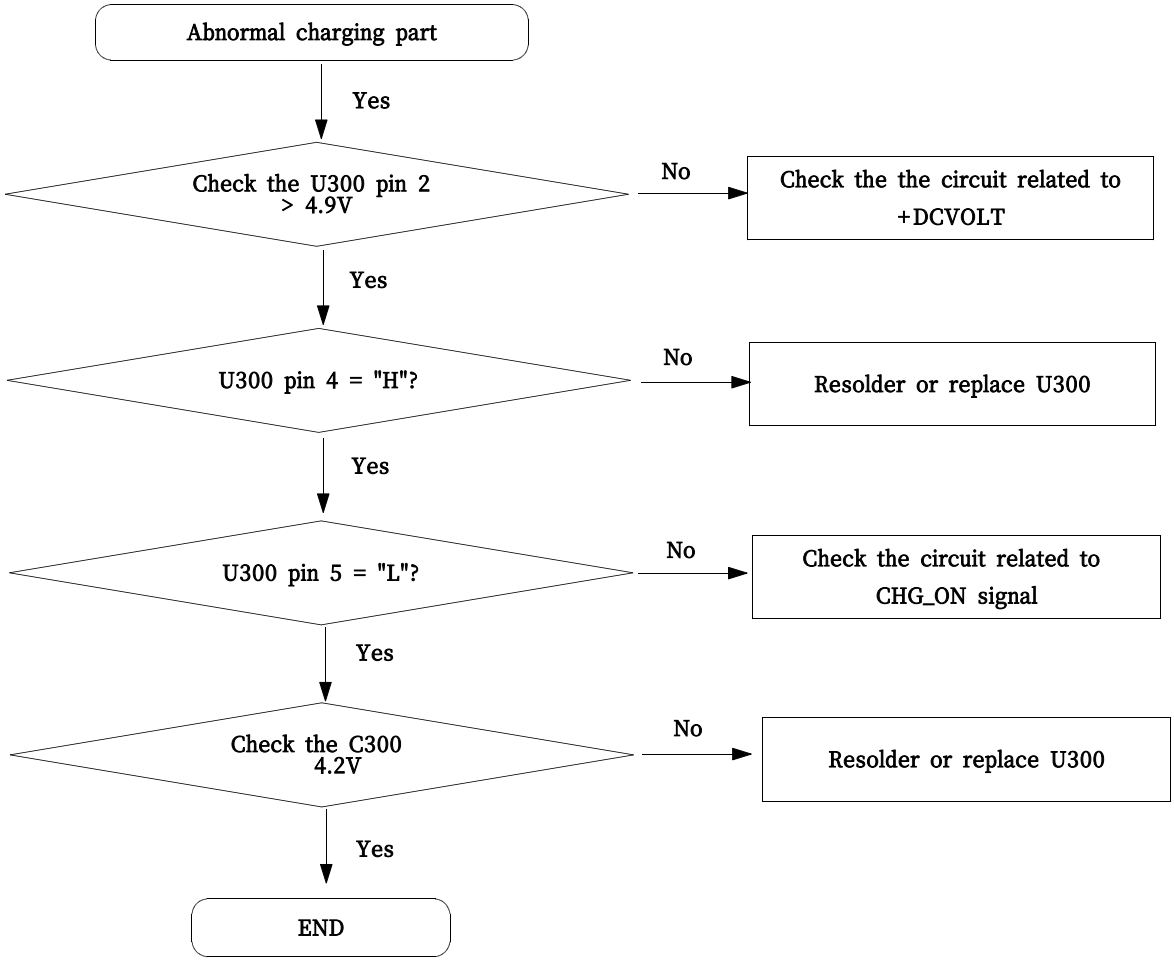
7-3. Charging Part



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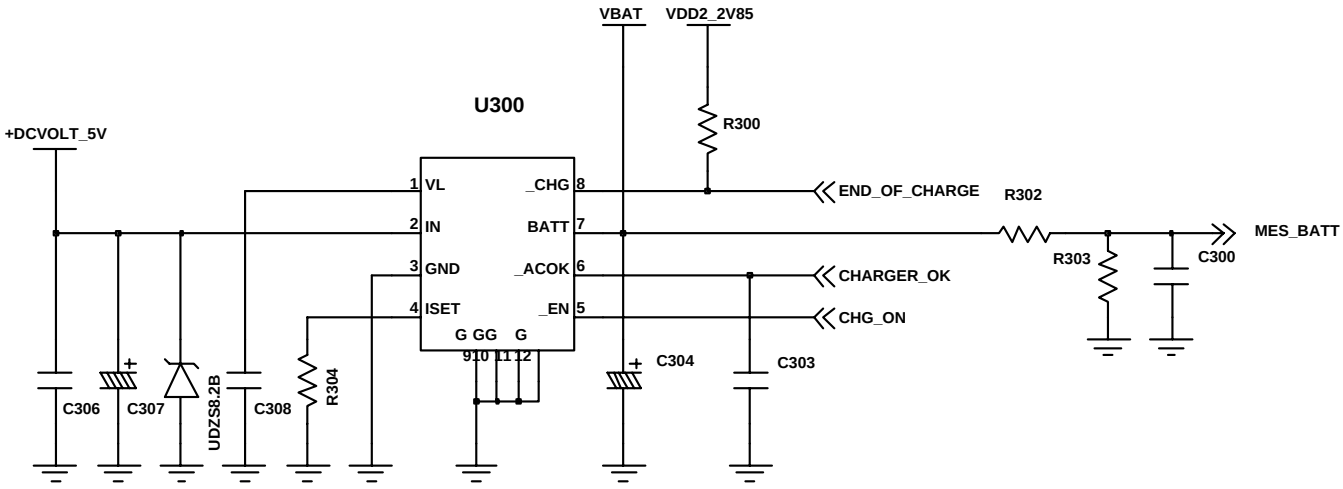
Charging



CHARGER IC

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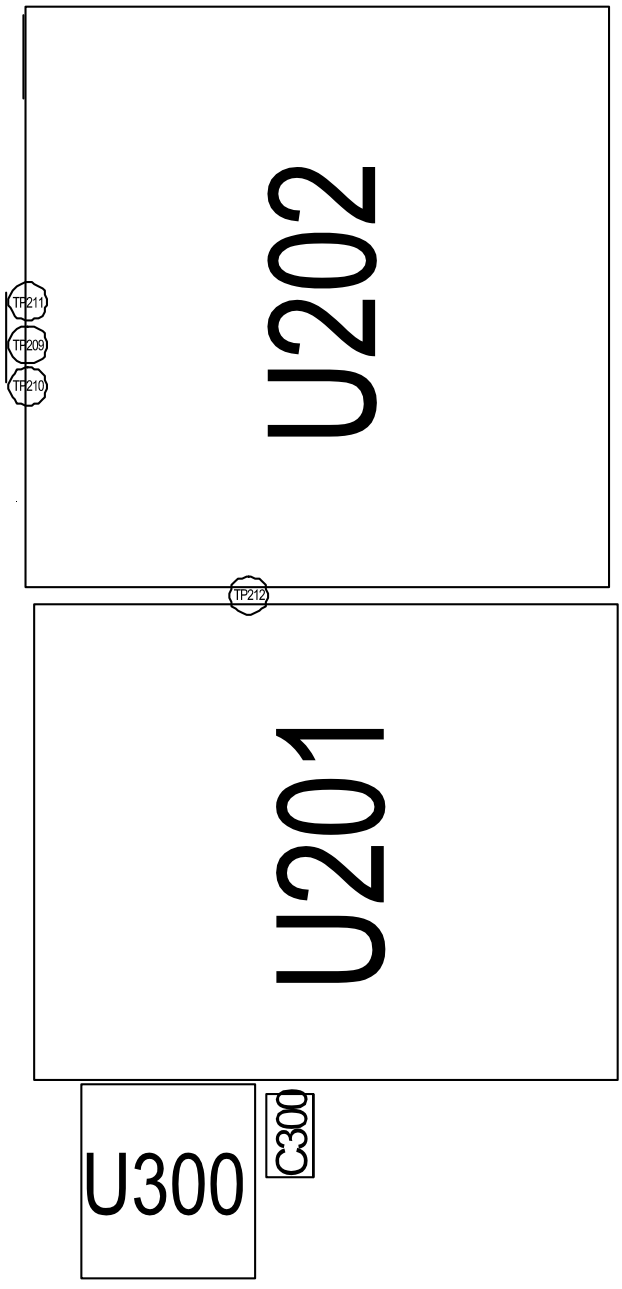

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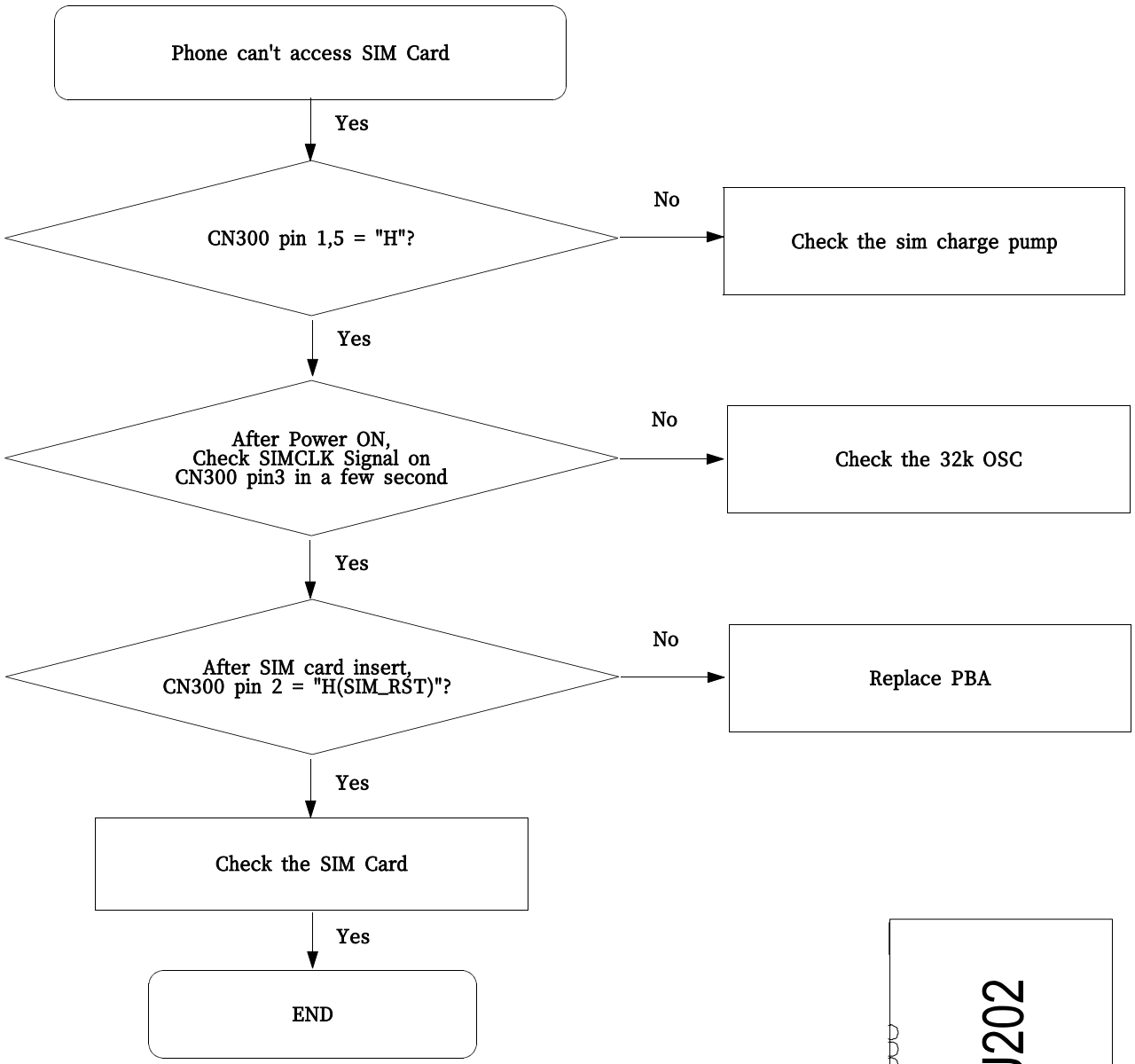
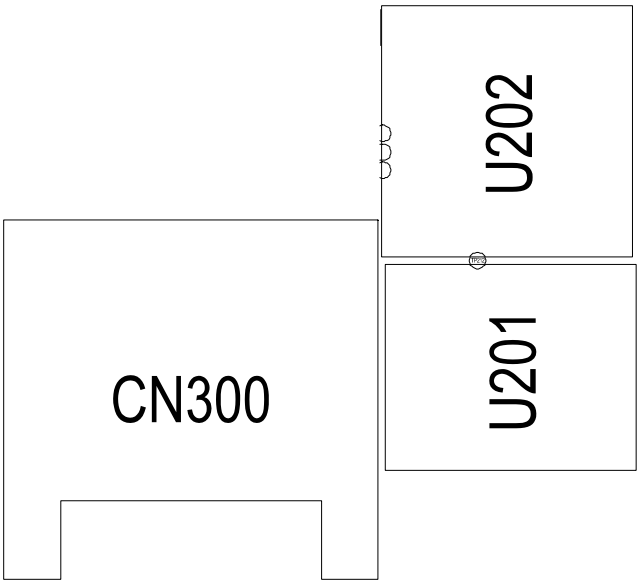
7-4. Sim Part





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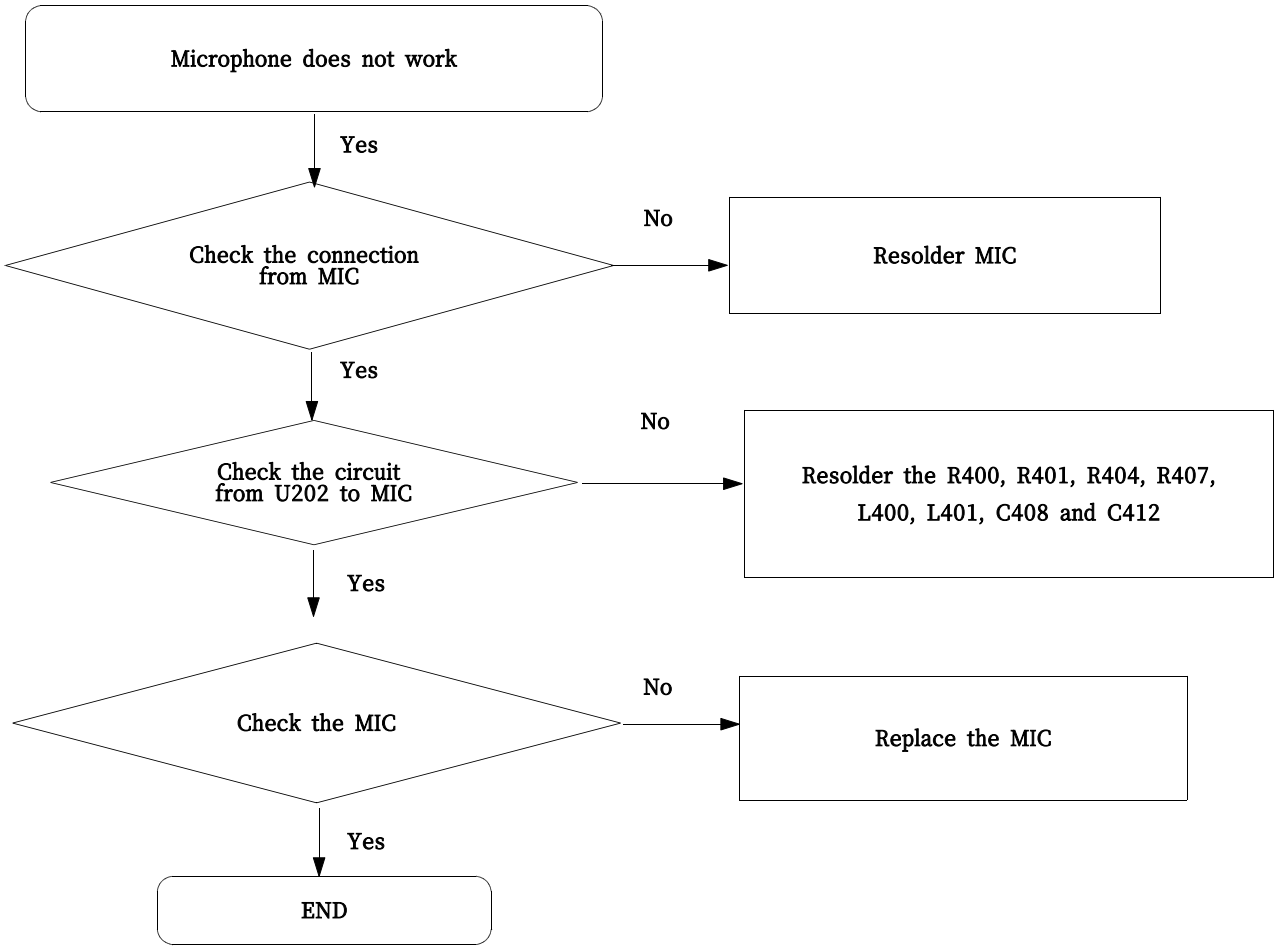
7-5. Microphone Part



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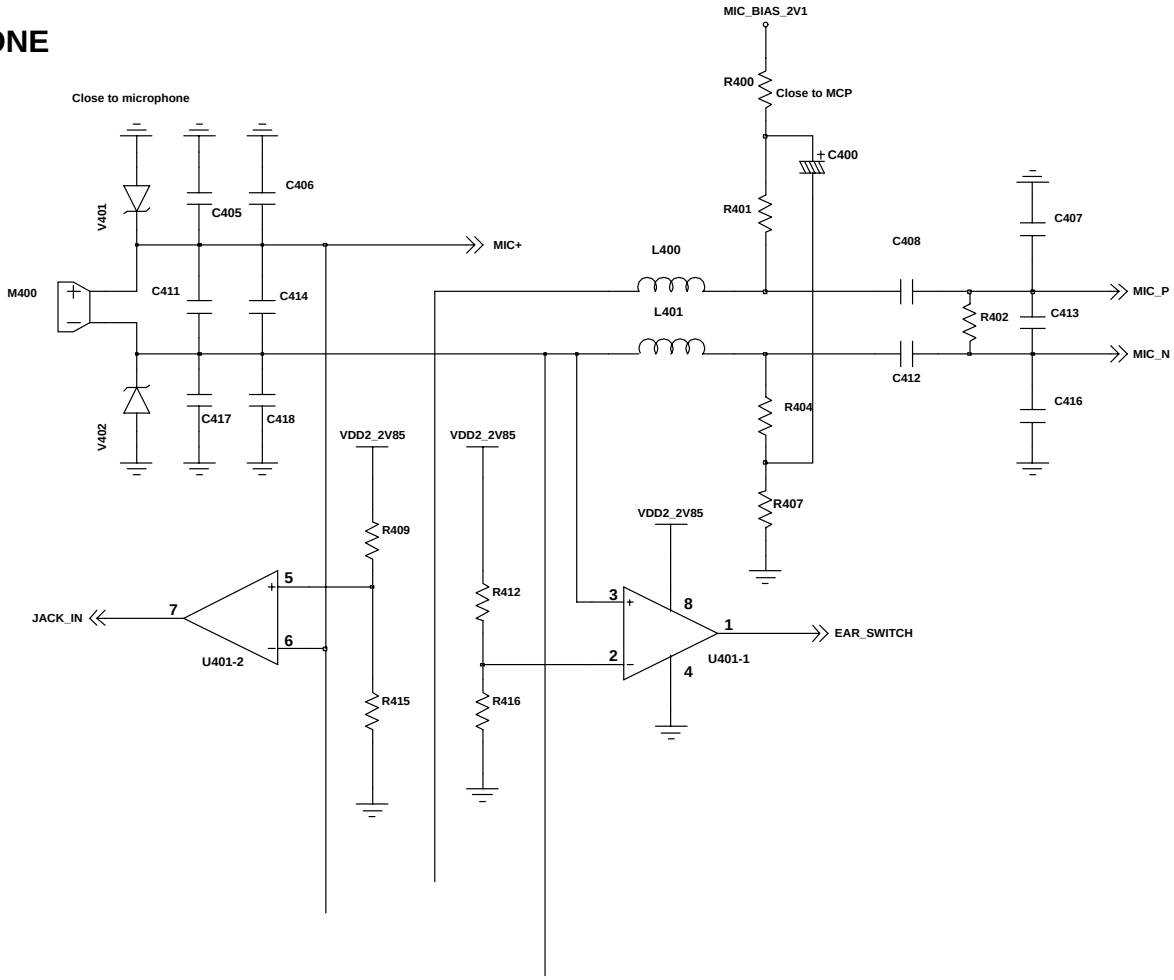
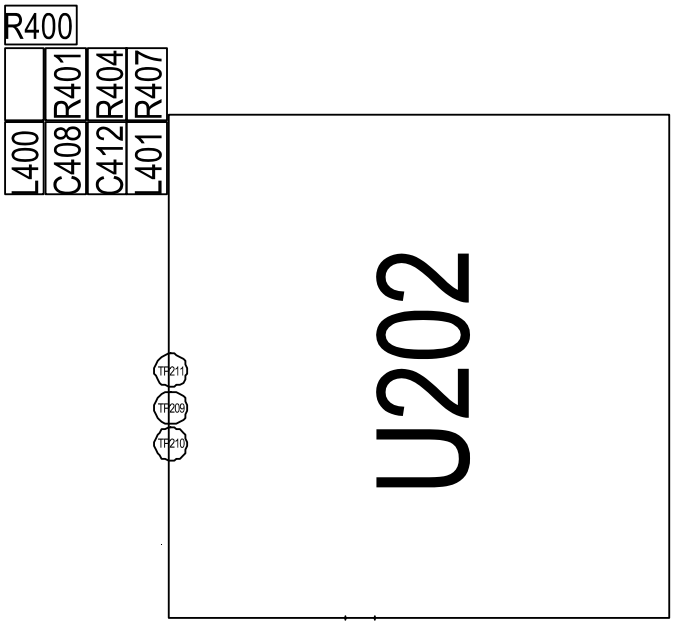
Microphone

MICROPHONE





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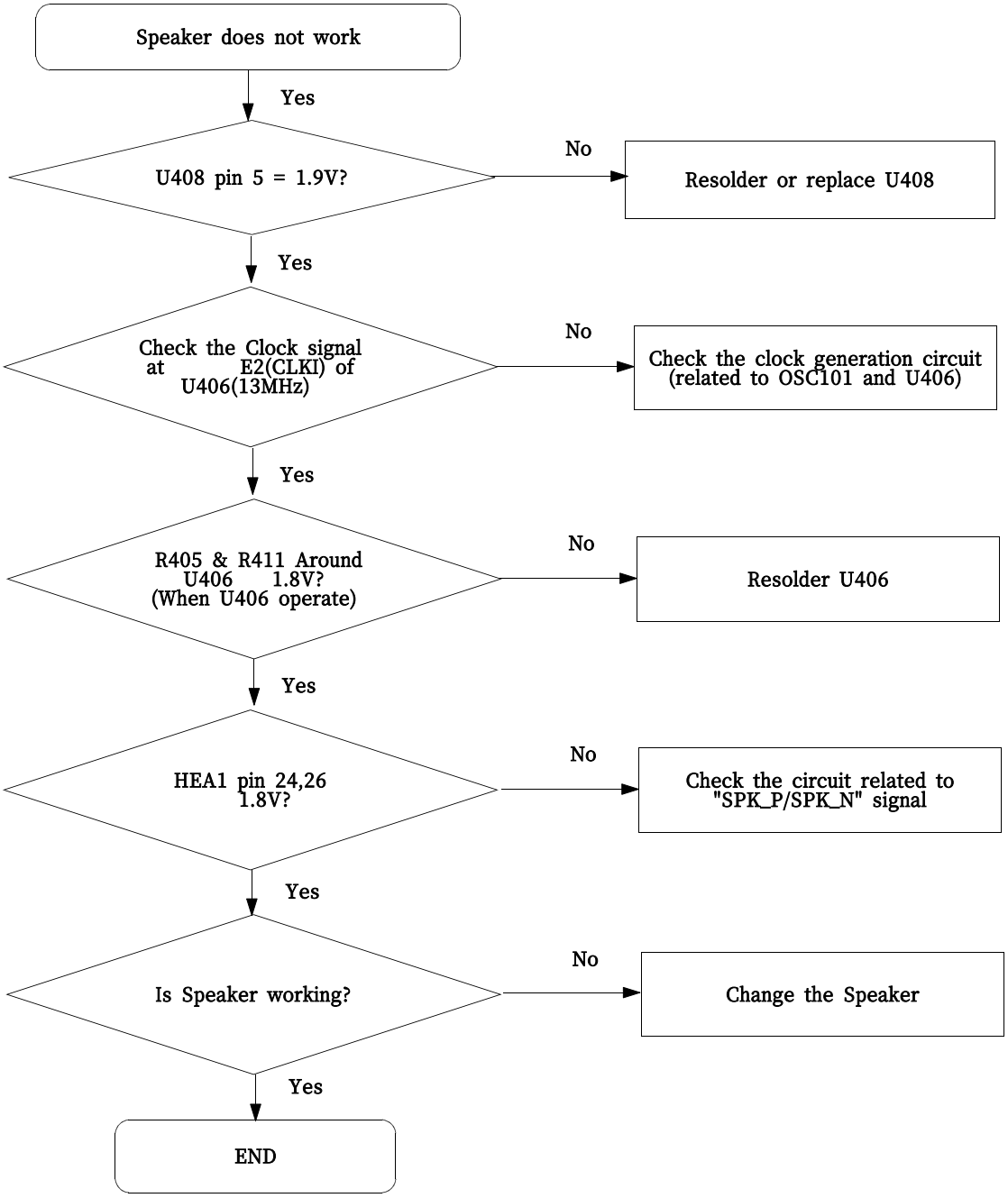
7-6. Speaker Part(Melody)



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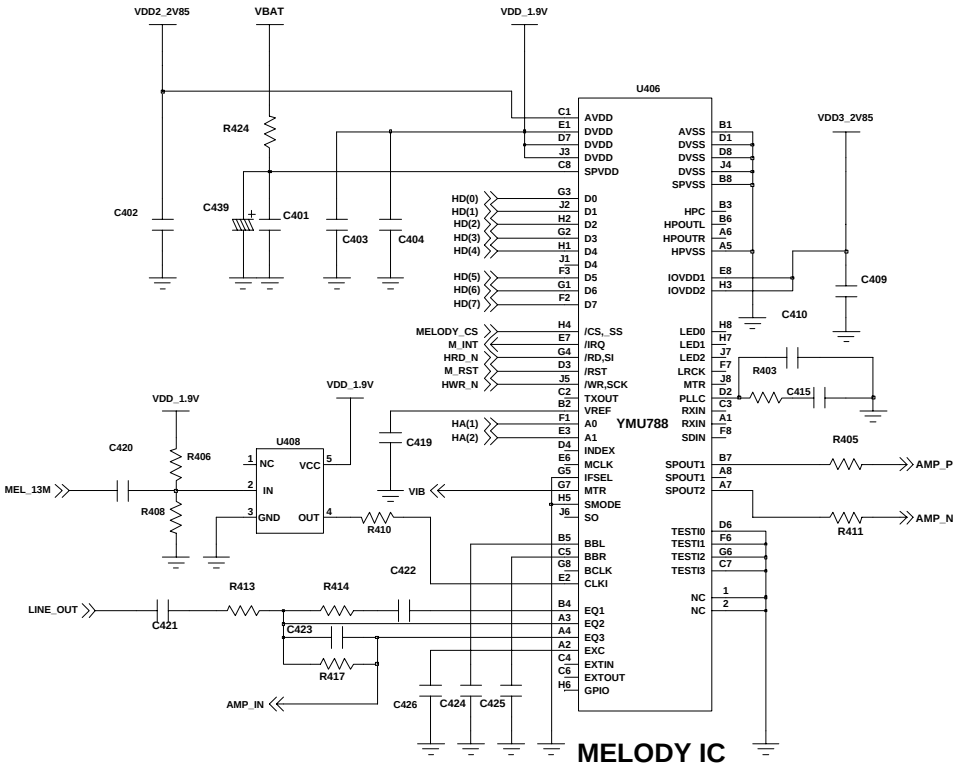
Speaker



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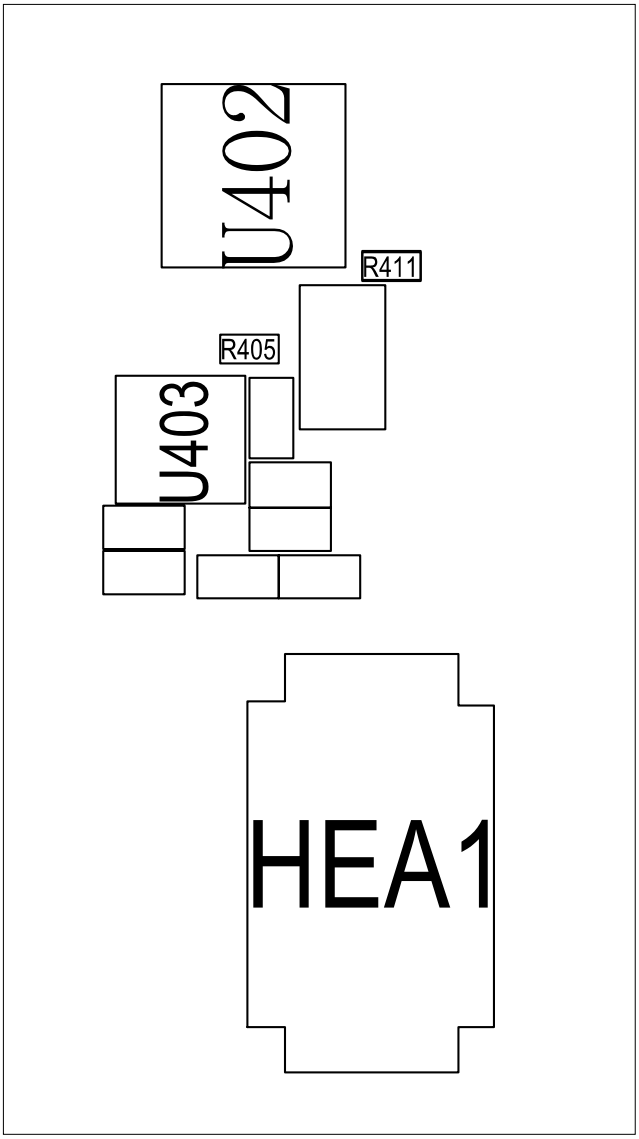

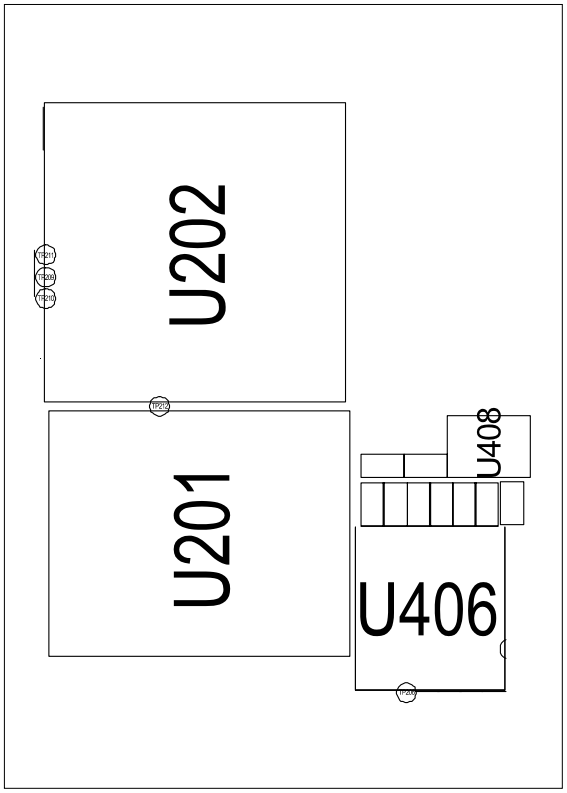

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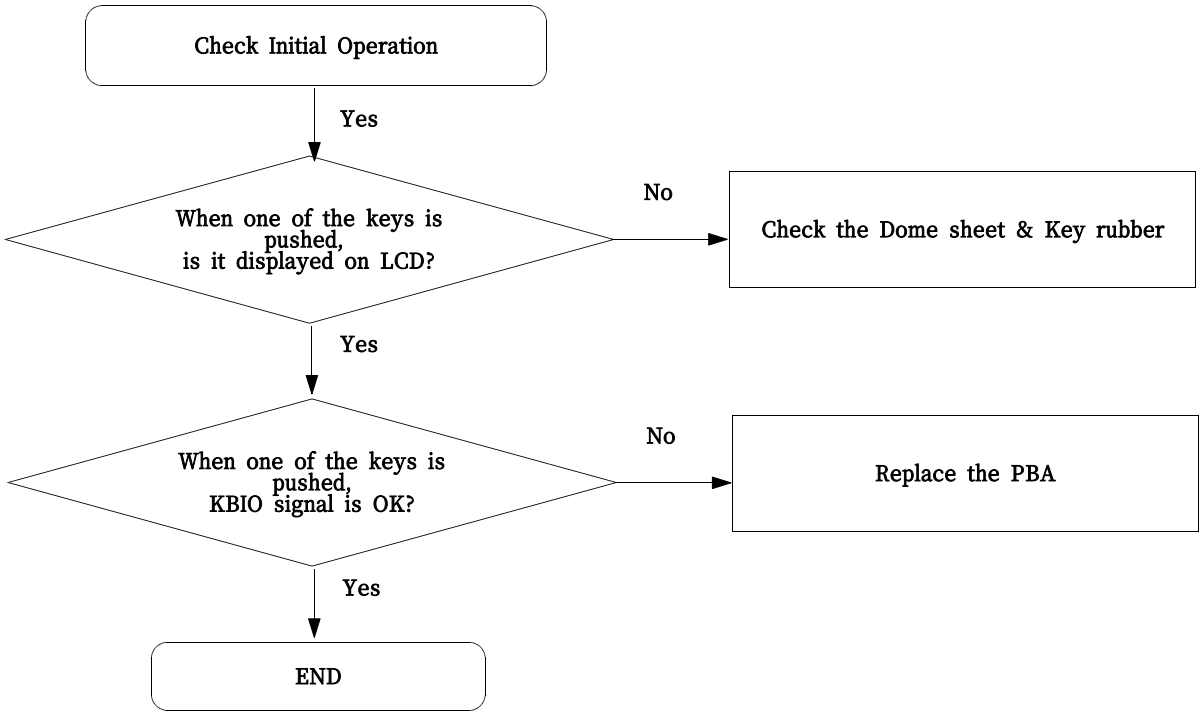
7-7. Key Data Input



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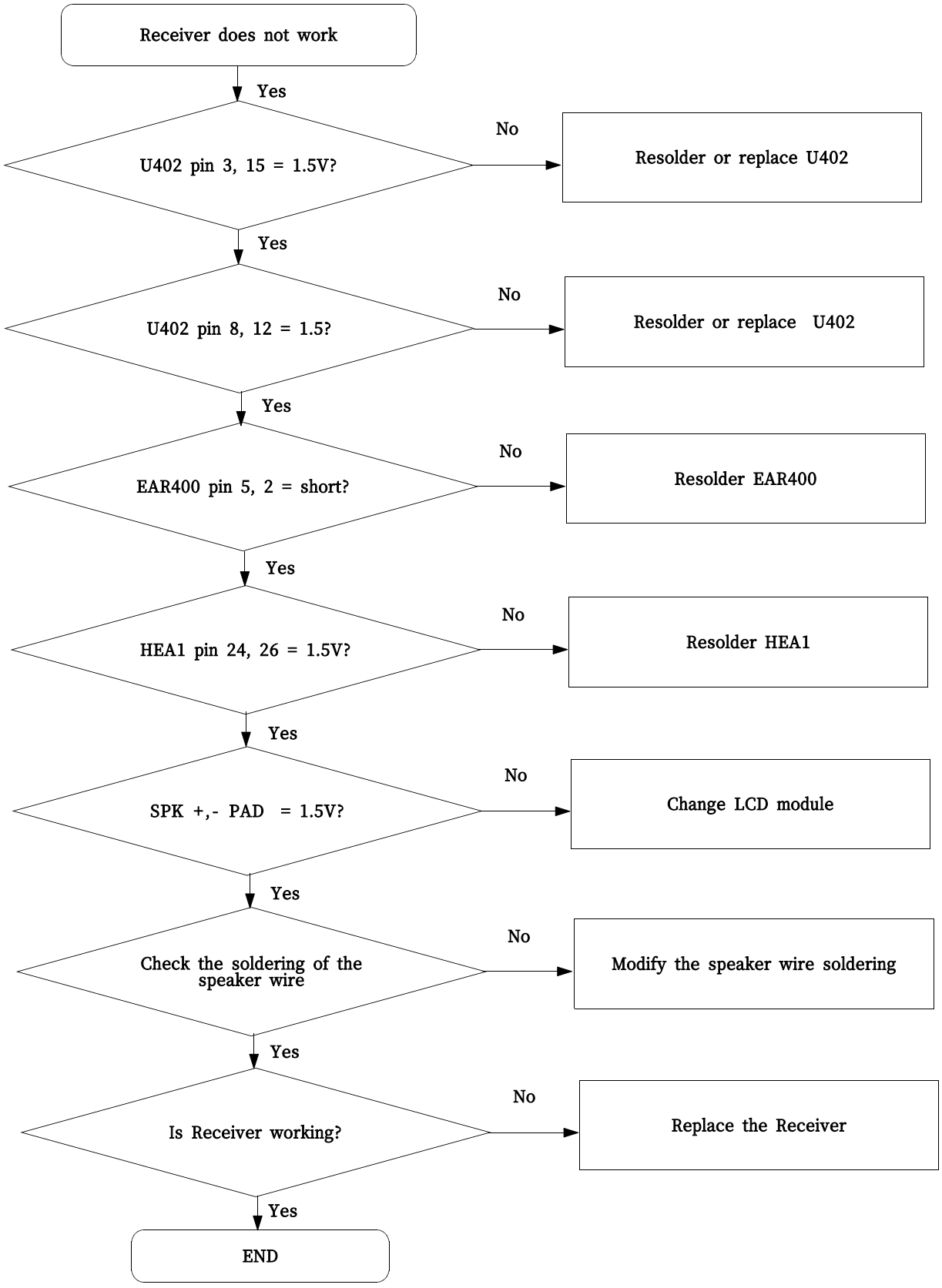
7-8. Receiver Part



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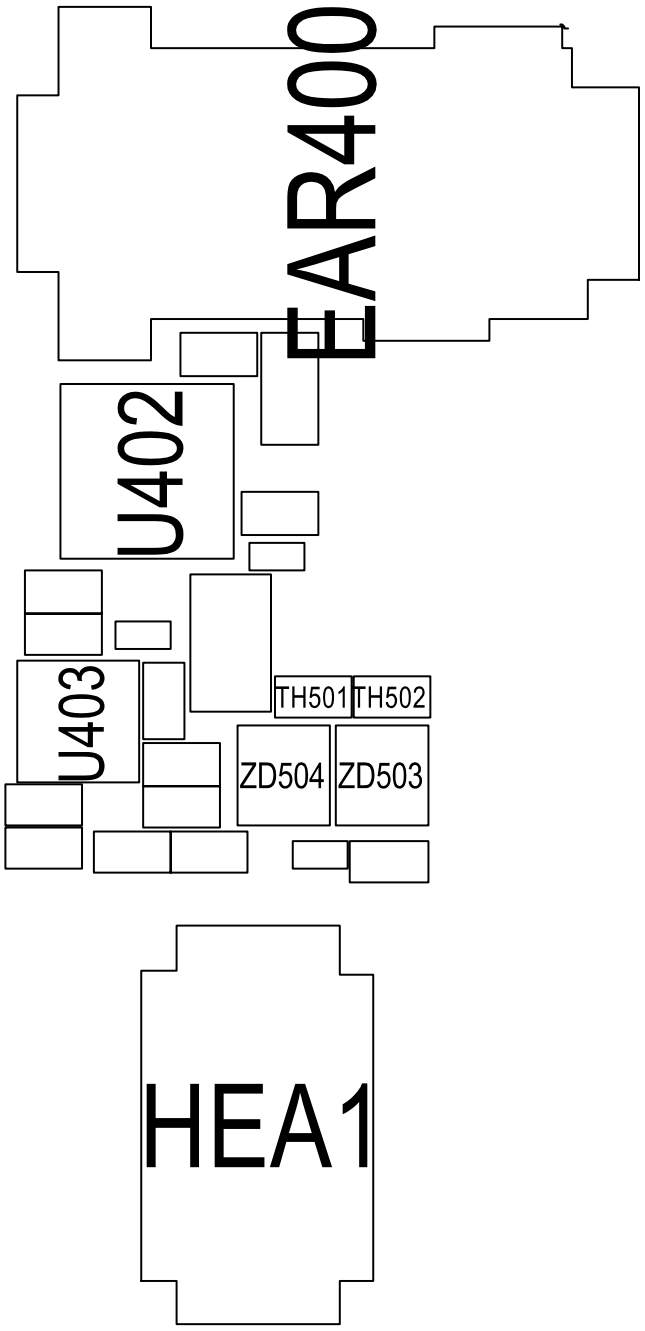

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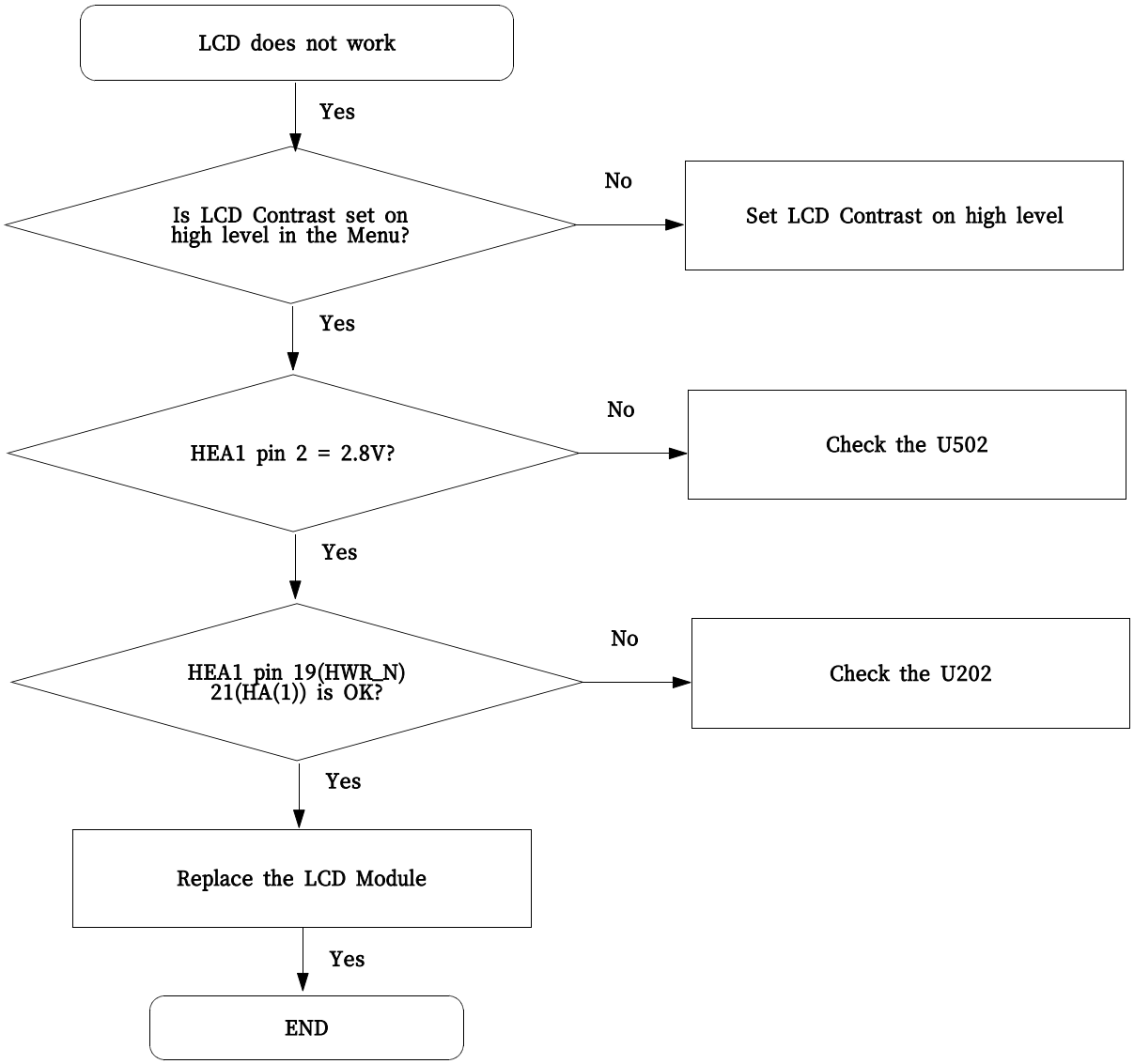
7-9. LCD Part (for Color Main)



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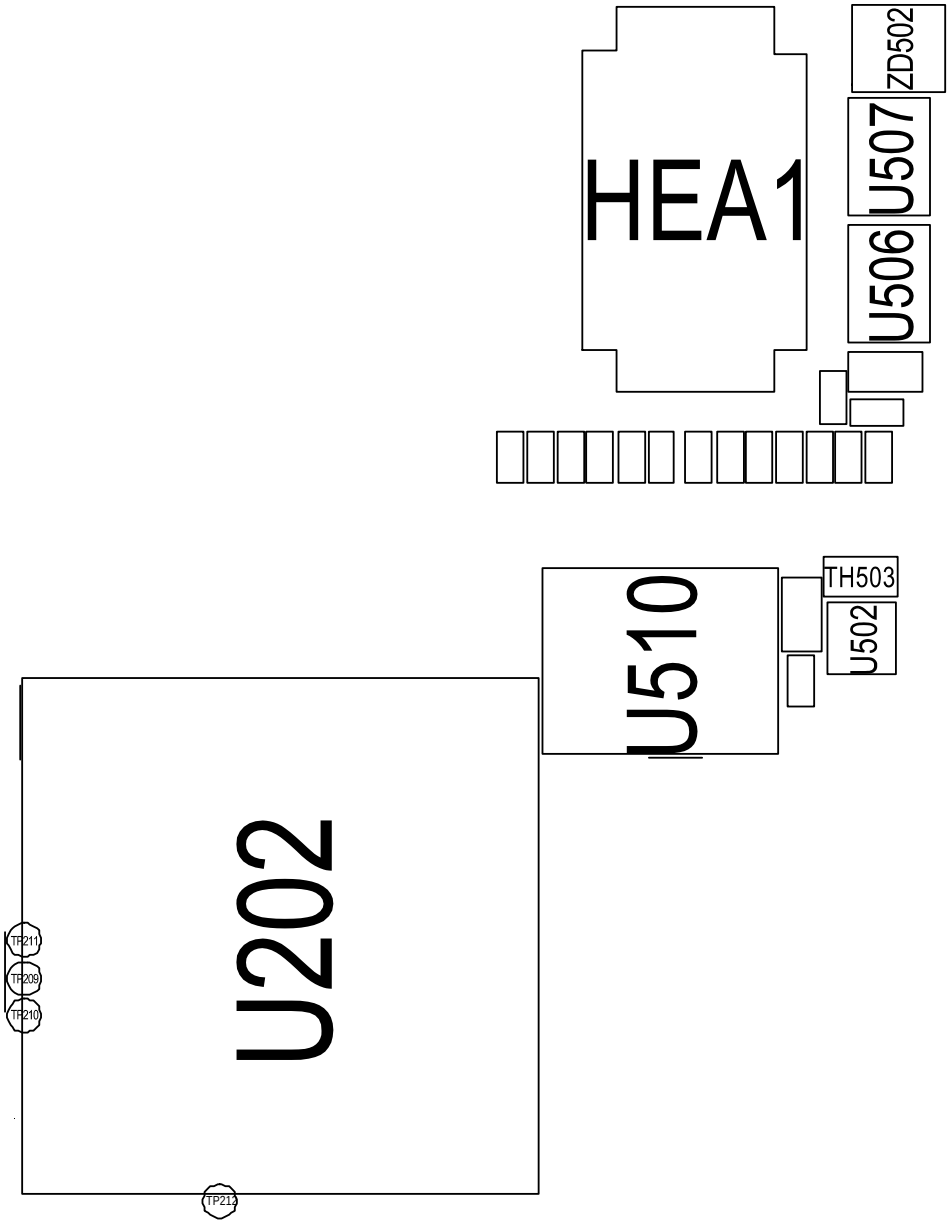

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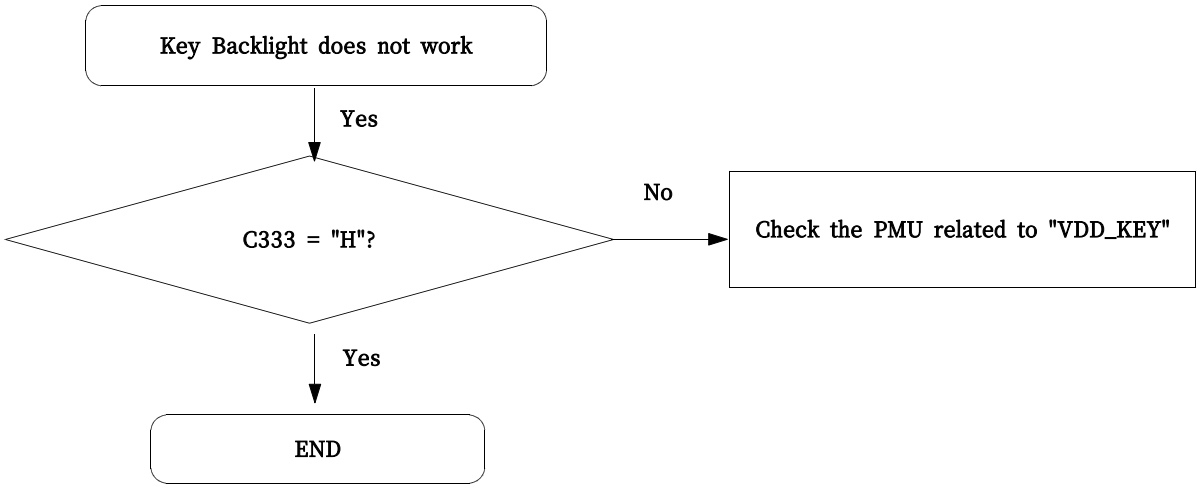
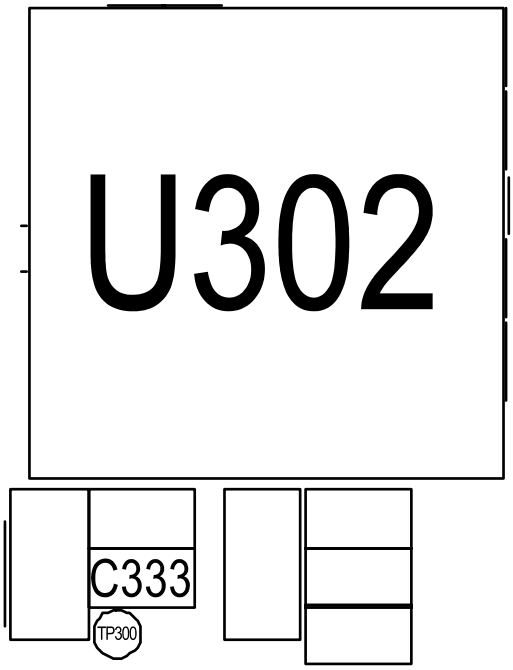
7-10. Key Back Light





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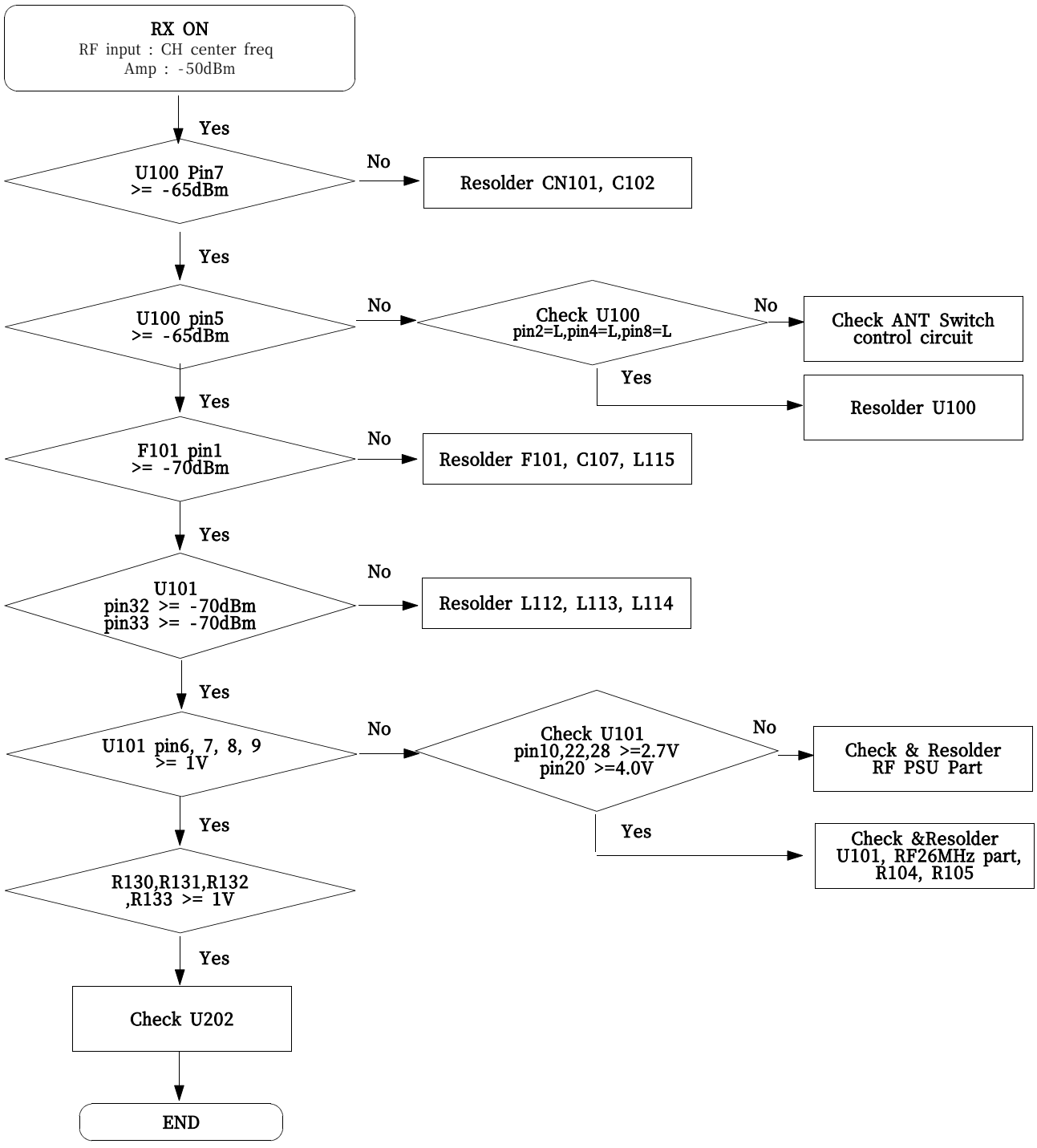
7-11. GSM Receiver



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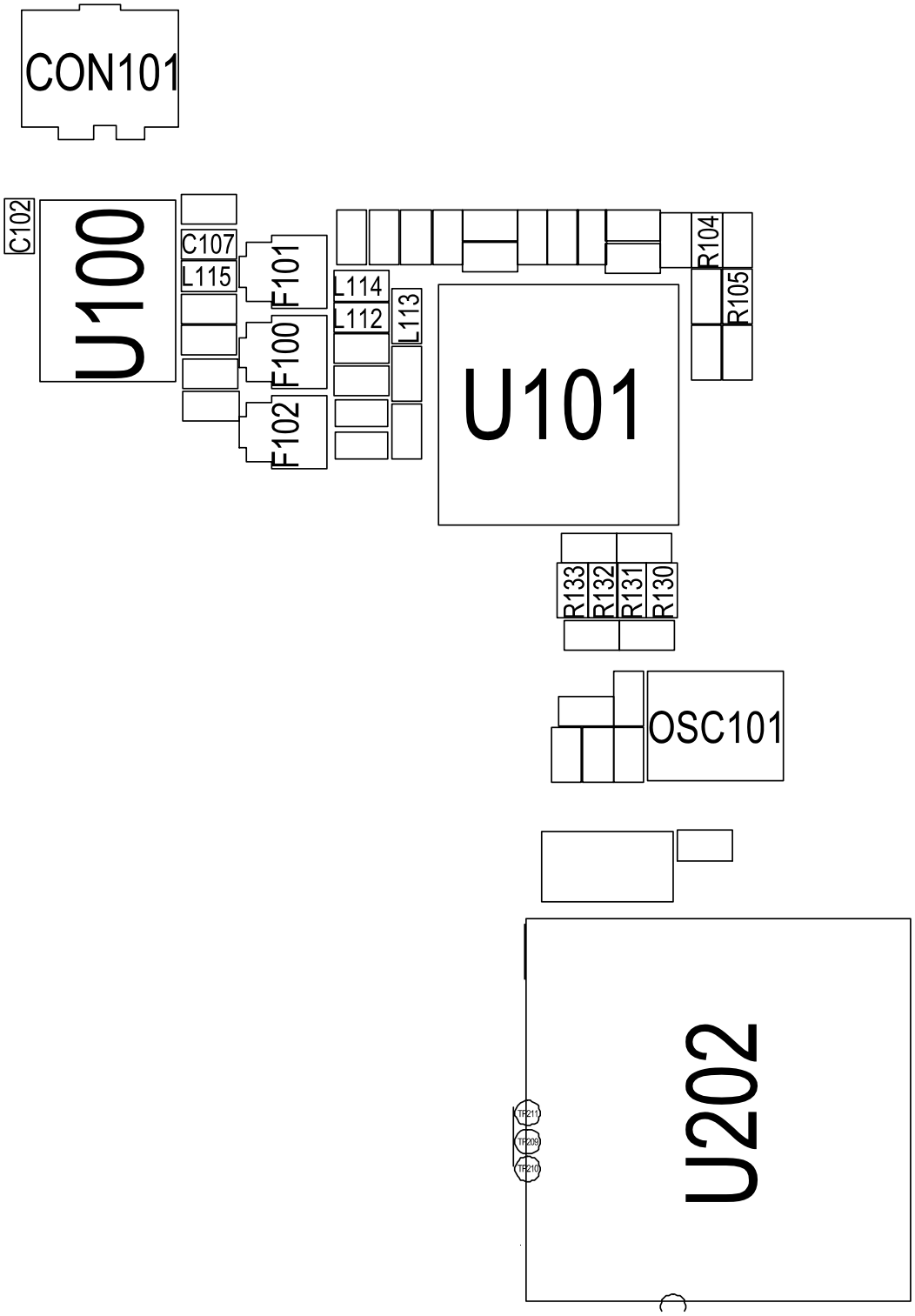

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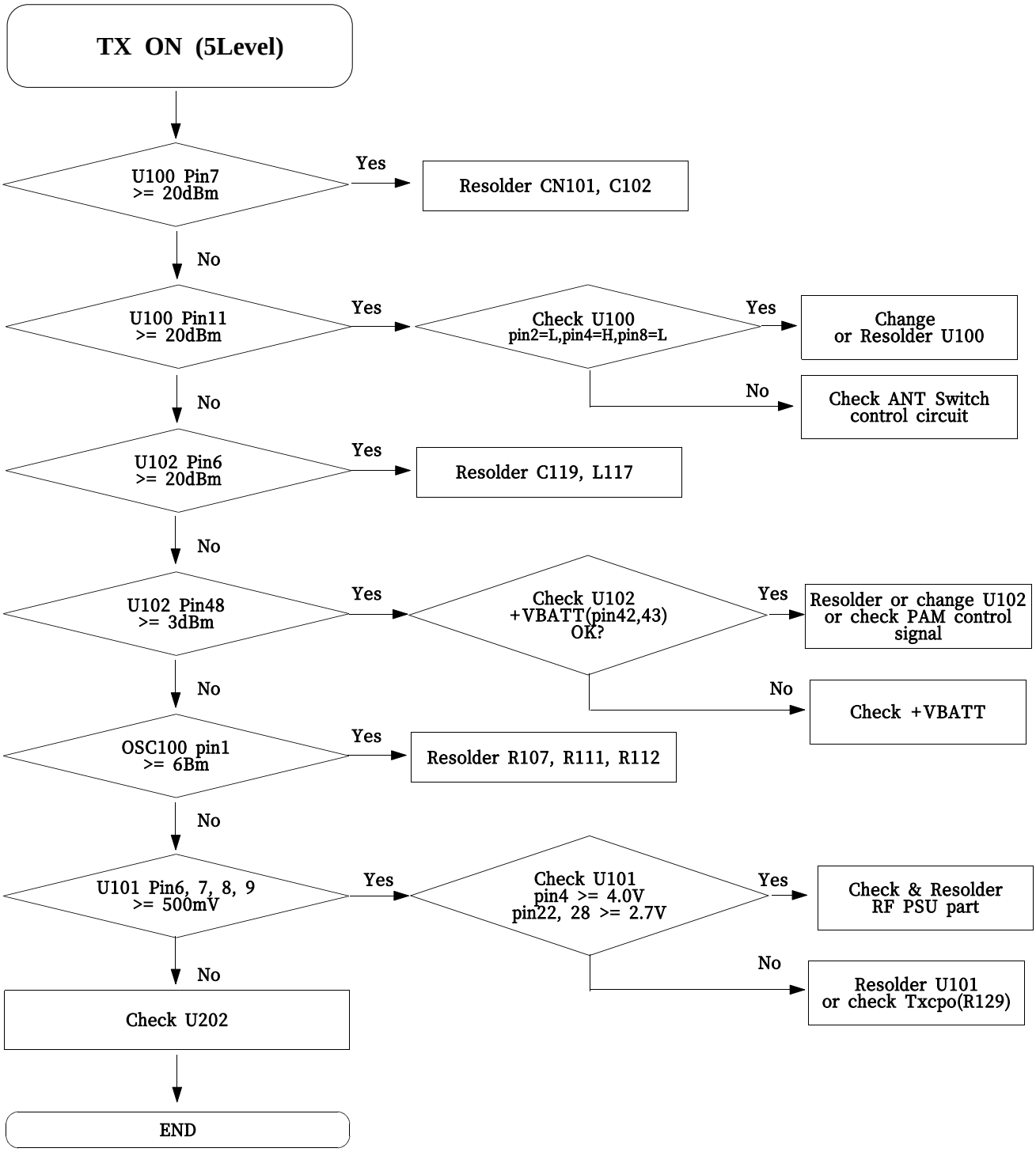
7-12. GSM Transmitter



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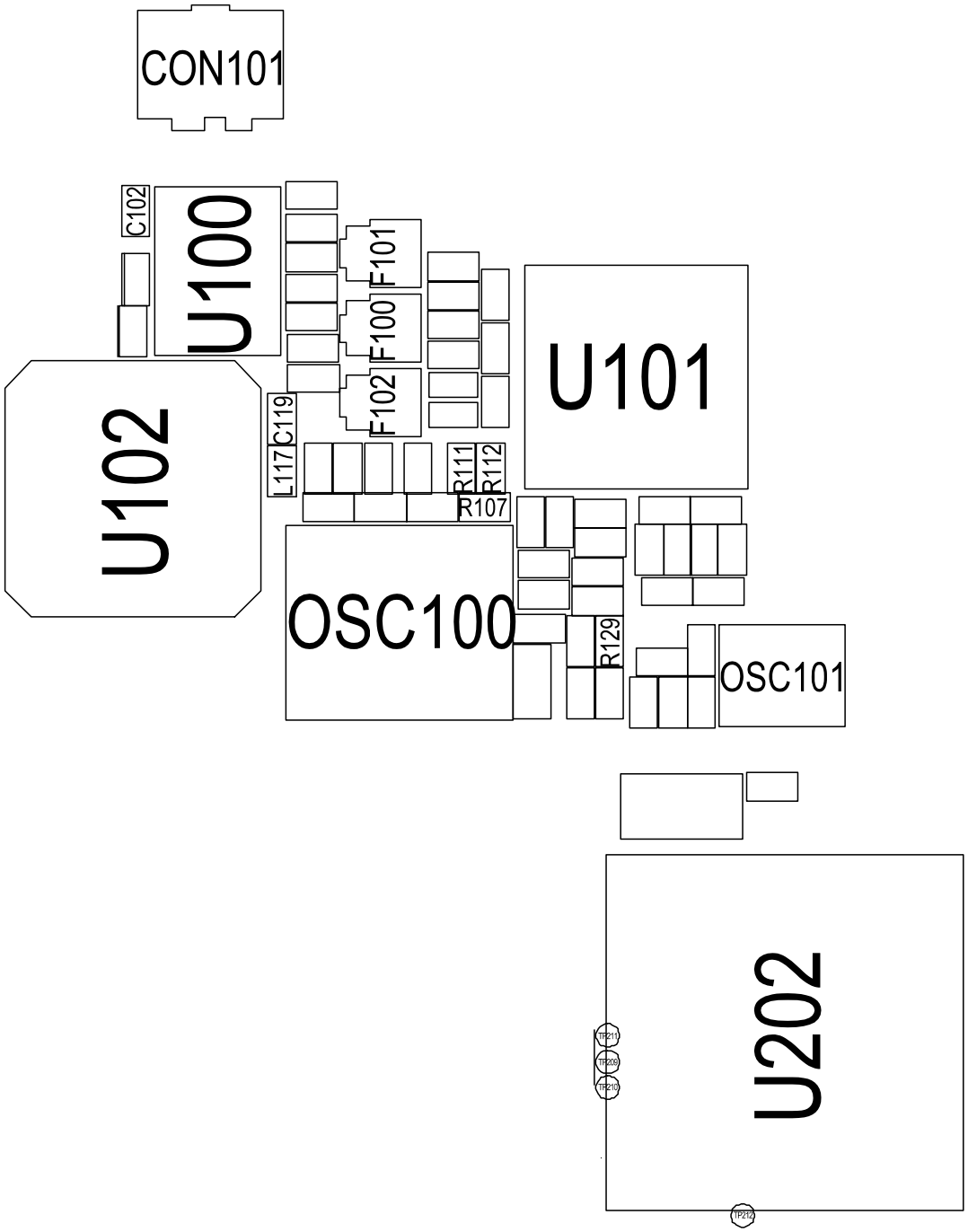

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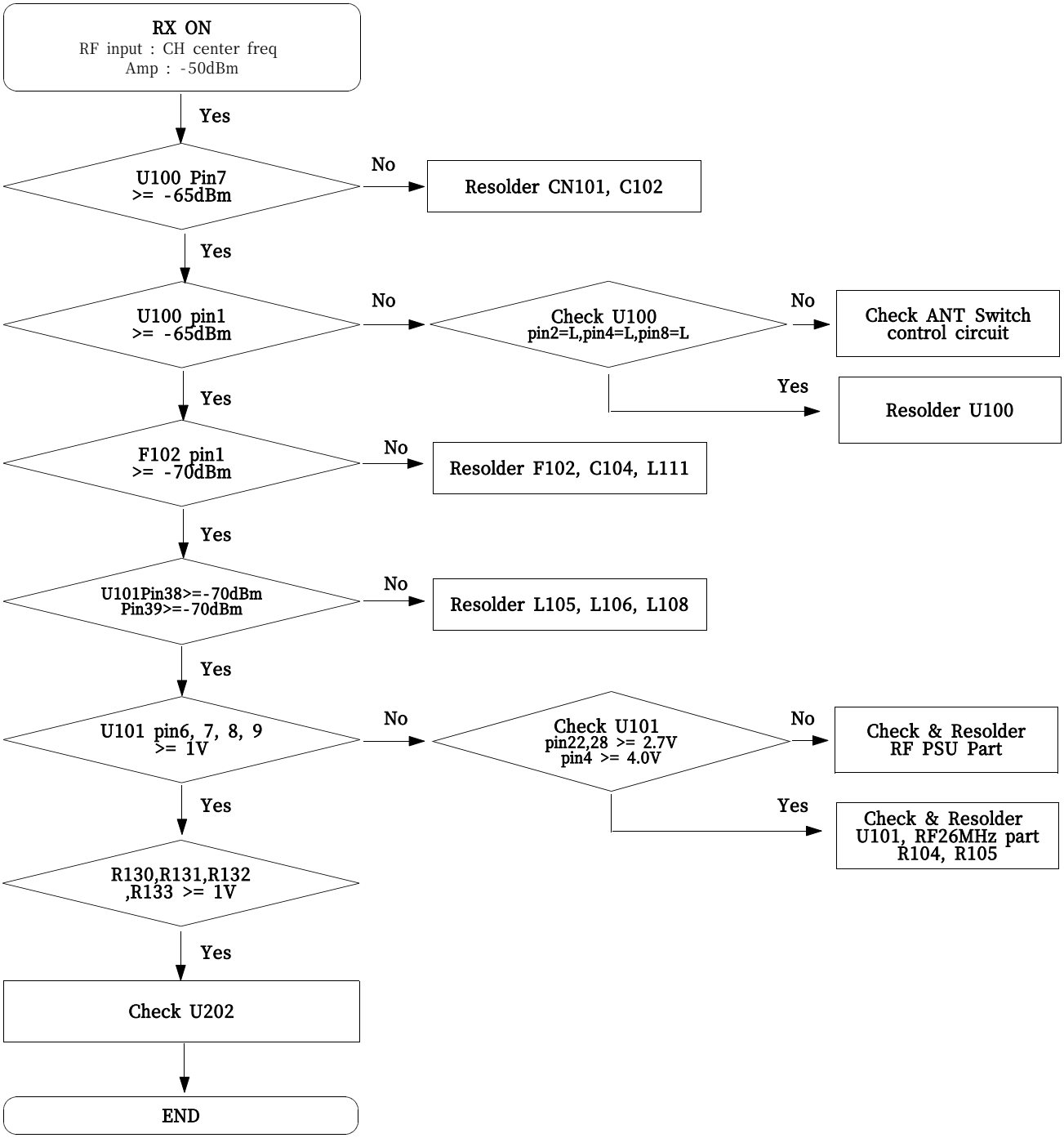
7-13. DCS Receiver



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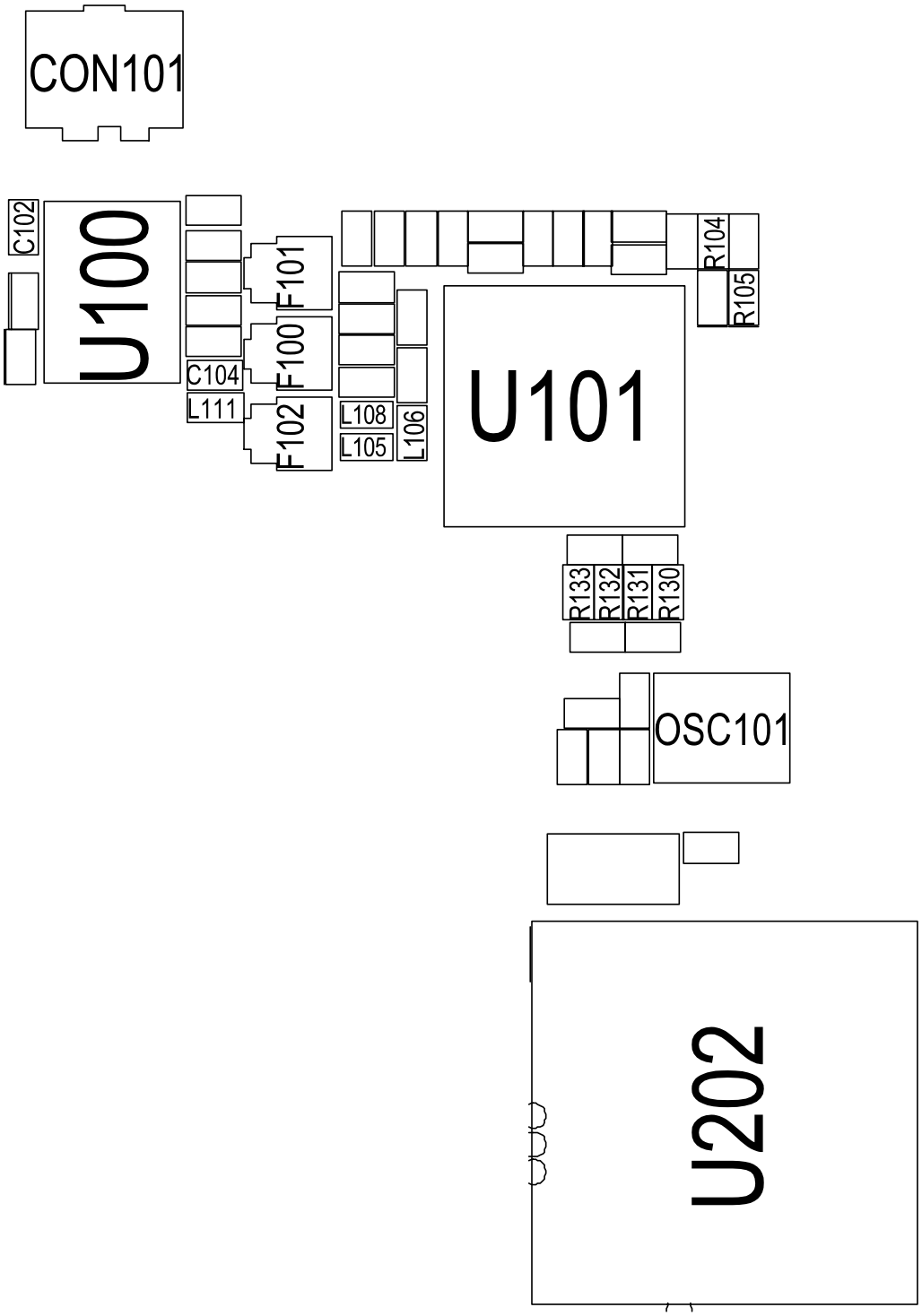

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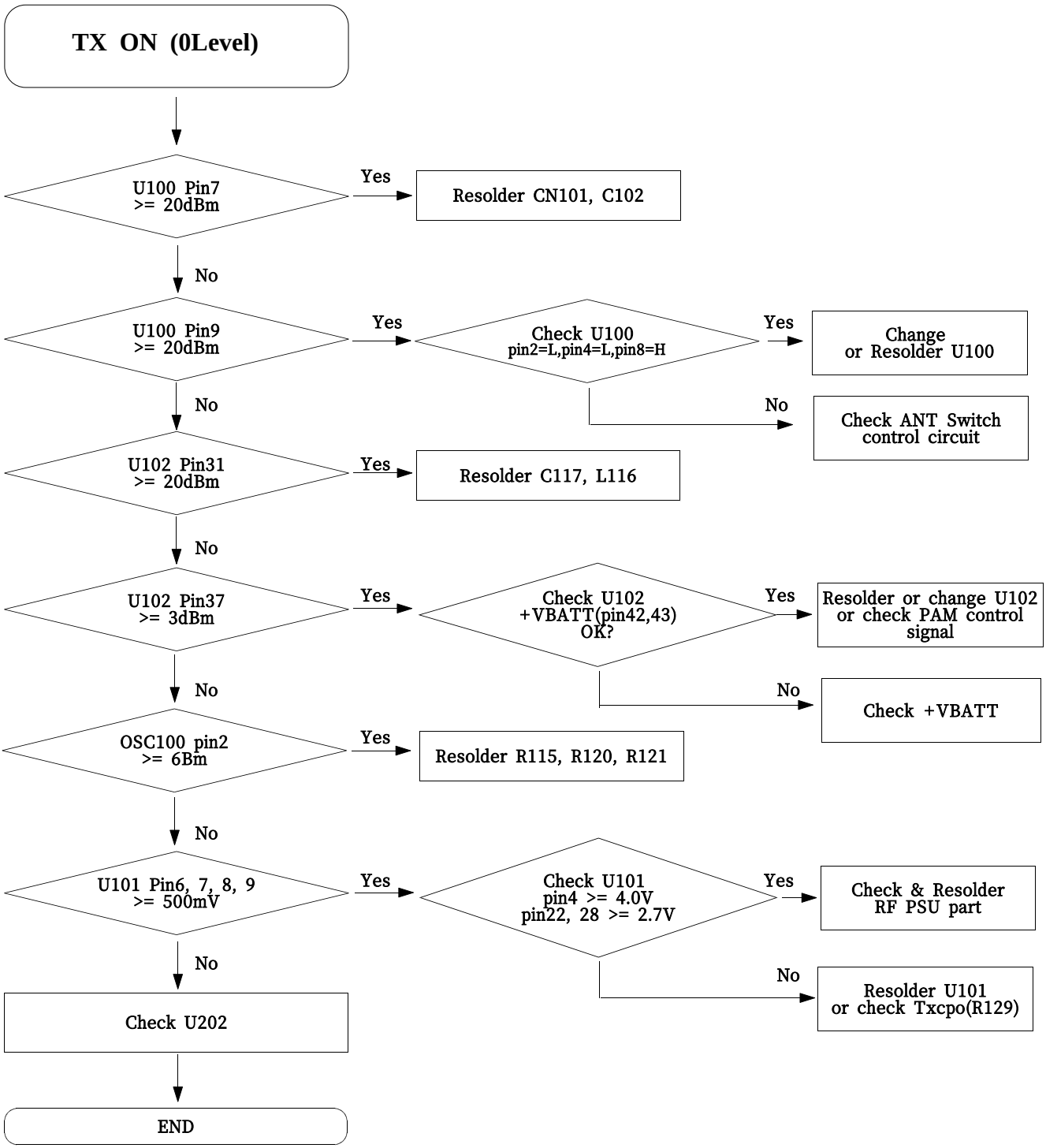
7-14. DCS Transmitter



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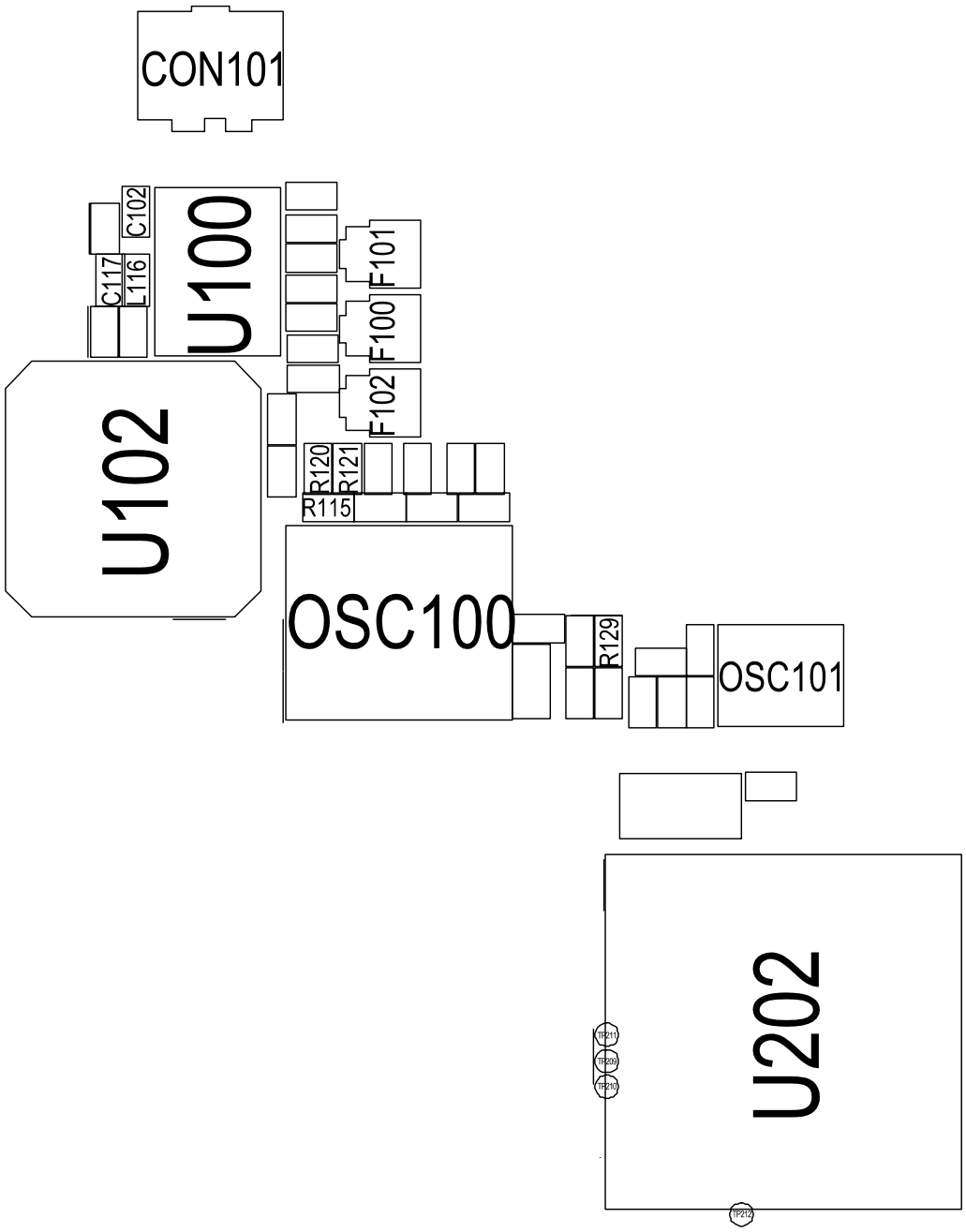

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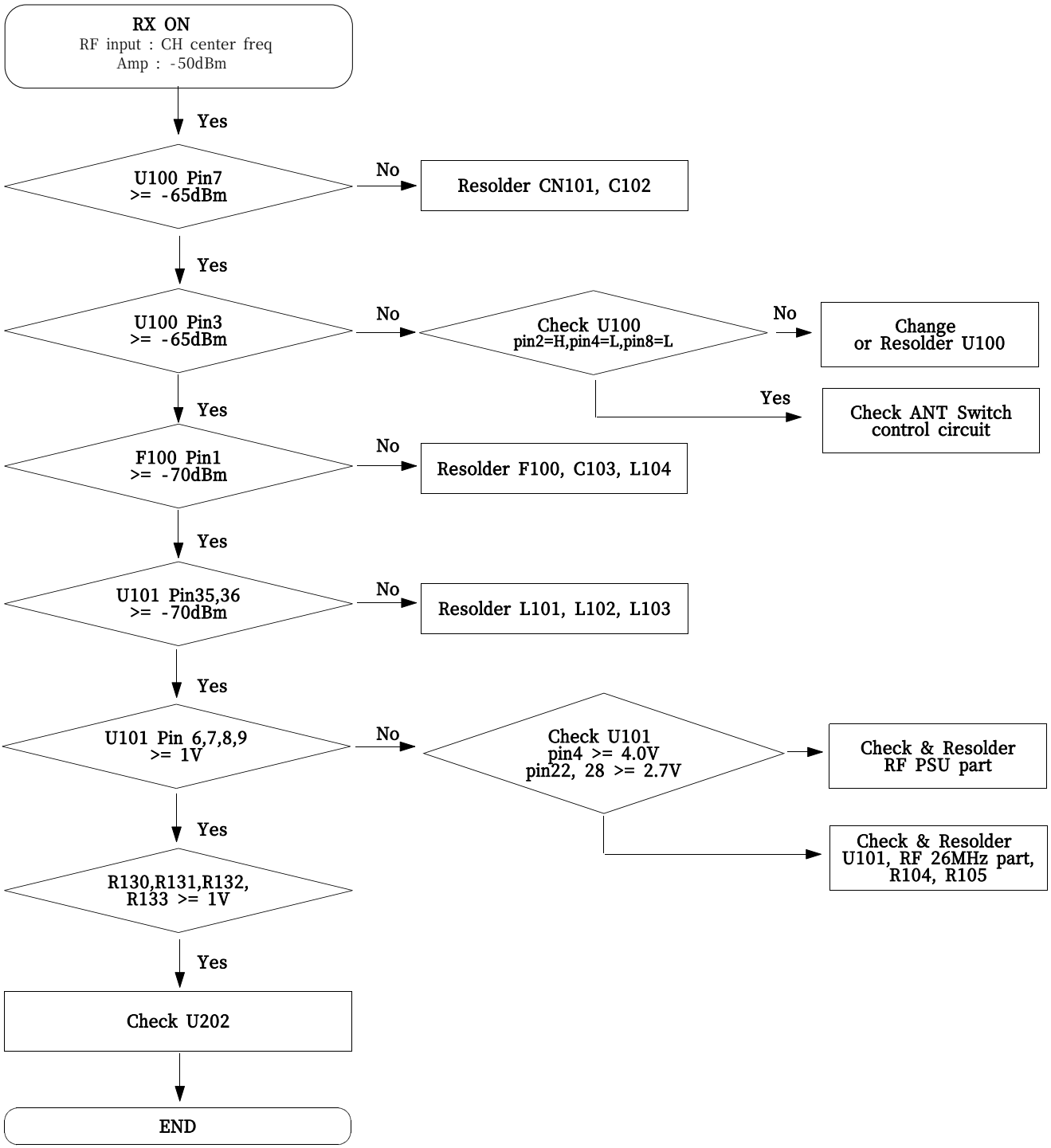
7-15. PCS Receiver



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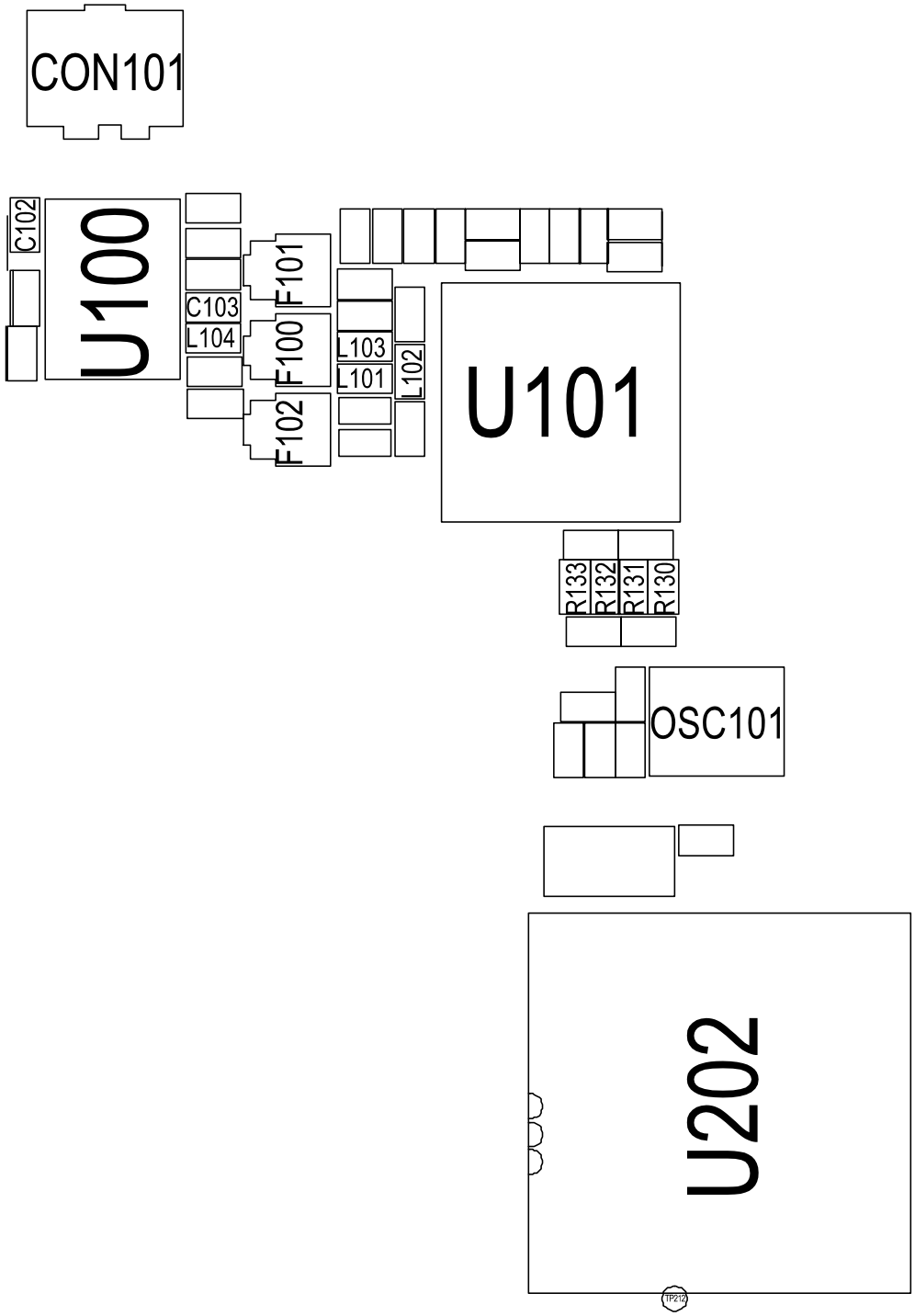

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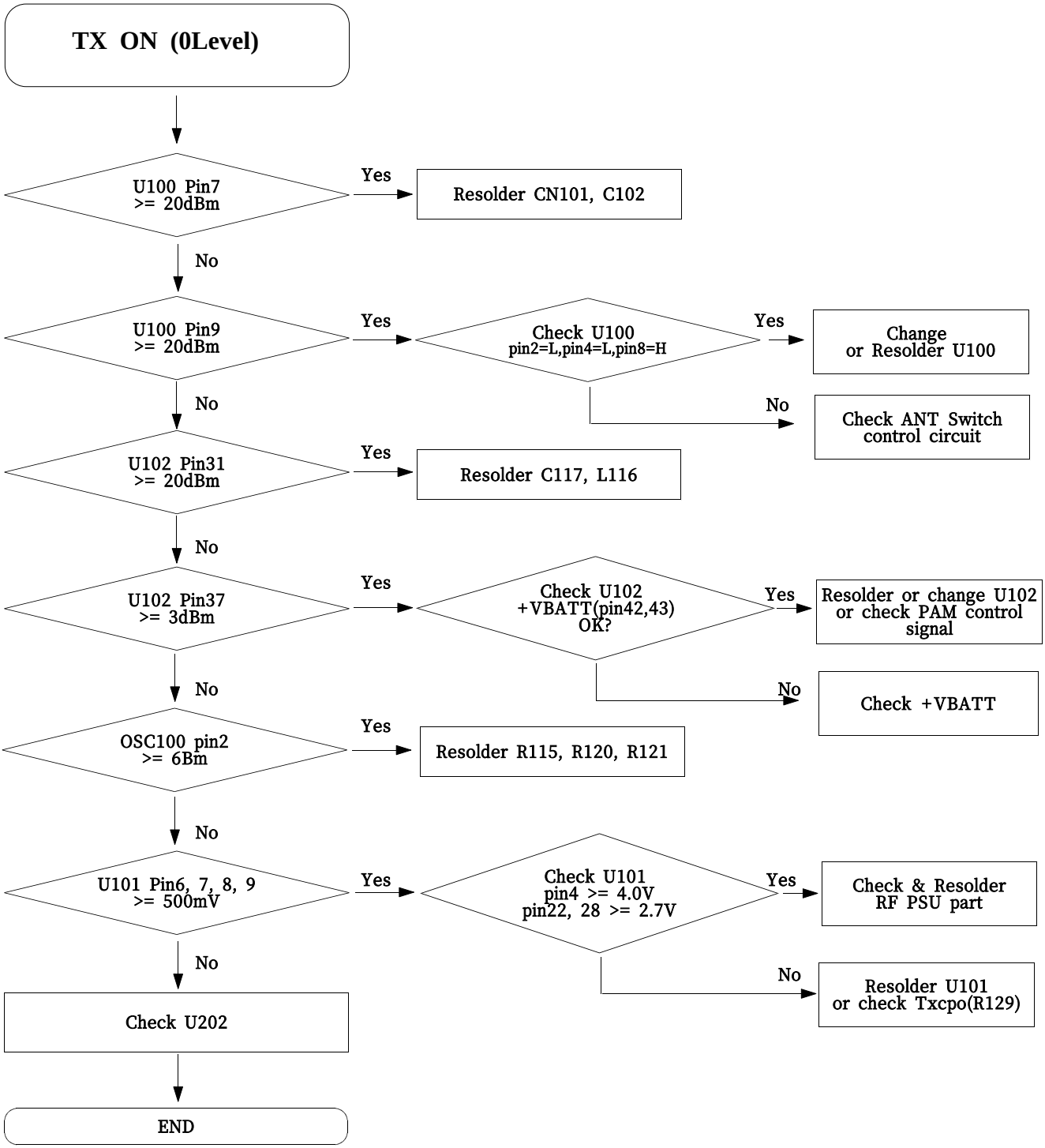
7-16. PCS Transmitter



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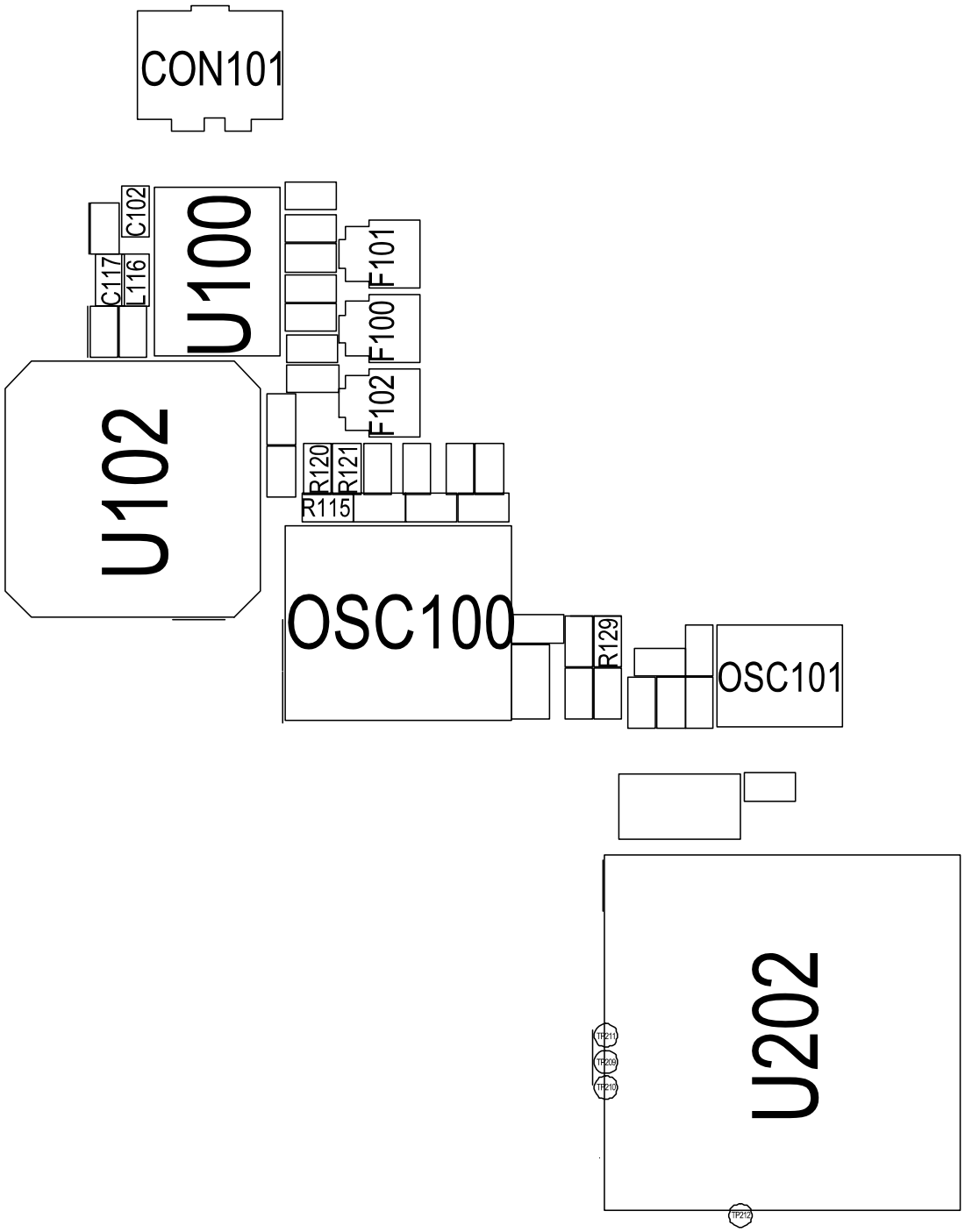

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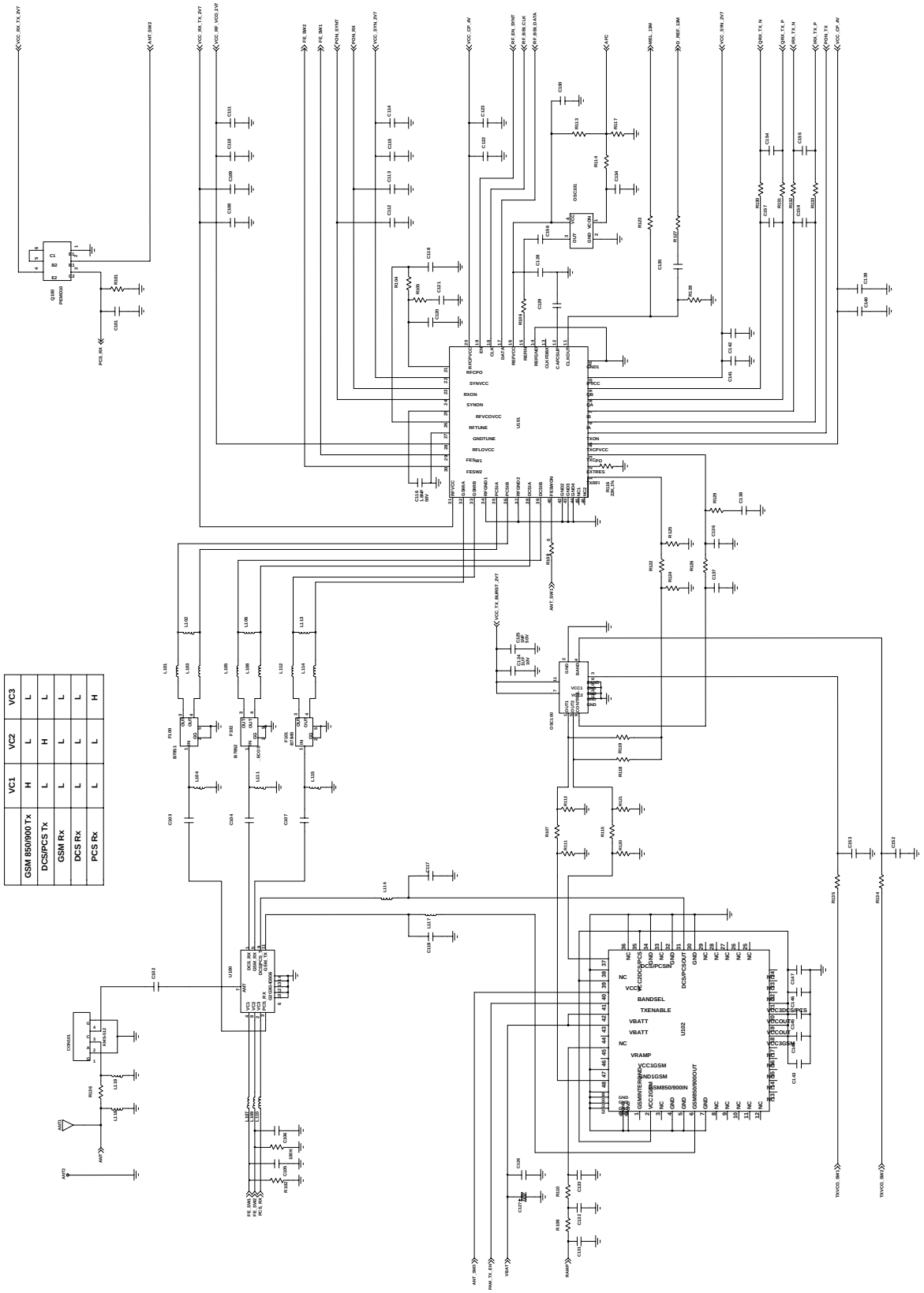
Transmitter & Receiver



	VC1	VC2	VC3
GSM 850/900 Tx	H	L	L
DCS/PCS Tx	L	H	L
GSM Rx	L	L	L
DCS Rx	L	L	L
PCS Rx	L	L	H

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